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OBJECTIVES OF THE AMERICAN ACADEMY OF DENTAL MEDICINE

(Quoted from the Constitution)

"To promote the study and dissemination of knowledge of the cause, prevention and control of diseases of the teeth, their supporting structures and adnexa and related subjects; and to foster and promote a better scientific understanding between the fields of dentistry and medicine."

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THE JOURNAL OF DENTAL MEDICINE

THE PRACTICAL SOLUTION TO THE PREVENTION AND CURE OF TEMPOROMANDIBULAR JOINT DISTURBANCES*

SAMUEL CHARLES MILLER, D.D.S., F.A.C.D., F.A.D.M.†

Temporomandibular joint dysfunctions because of their intimate associations with occlusal abnormalities, belong to the province of the dentist. The following article is intended to simplify the subject and eliminate the great amount of confusion that now exists.

The anatomy and physiology of the temporomandibular joints is so well described in textbooks on anatomy, physiology and orthopedics that they will not be discussed here. Neither will this paper consider the fractures, dislocations, malignancies and other disease factors which can be diagnosed and treated with a fair degree of accuracy. However, probably over 90% of the temporomandibular joint cases which the dentist is called upon to diagnose and treat do not fall into the above categories. These cases, nevertheless, are responsible for severe pain, dysfunction and psychic impacts by their severity, chronicity, and ability to interfere with mastication, speech and emotional security.

THE ROENTGENOGRAM IN DIAGNOSIS OF TEMPOROMANDIBULAR JOINT DYSFUNCTION

In spite of the many papers that have been written on the variations in joint positions interpreted from roentgenograms as they affect the comfort of the joint, such findings should be considered inexact and matters of *interpretation*. Slight variations in angle of incidence of the rays, small deviations in head position, or subconscious alteration in mandibular location by the patient due to pain, muscular spasm or fear, or bad postural positioning in roentgenographic technique, will alter the roentgenographic findings enough to cause misinterpretation of the position of the head of the condyle in the joint cavity. The reclining posture is especially to be condemned because it permits a sag of the mandible to one side causing distortion of the position of the condyles. In open roentgenograms, when the bite block is placed between the anterior teeth, a protrusive opening instead of simple opening may further distort the interpretation. Although roentgenograms are necessary to determine bone and joint diseases and fractures, and to record dislocations, the majority of temporomandibular joint dysfunctions will give more information by their clinical subjective and objective symptoms than can be derived from the roentgenogram.

THE TEMPOROMANDIBULAR JOINT IS NOT A MACHINE

It is so easy to describe a part of the body by comparing it to some simple mechanical counterpart, that the diagnostician and student start to think in a mechanical way and thus are blinded to the many biologic complexities of diagnosis and treatment. The temporomandibular joint is not a mechanical contrivance but a physiologic organ comprised of bone, cartilage, muscles, nerves, blood and lymph vessels, and many other structures, both gross and microscopic, with their physiologic and biochemical implications. The mechanical component is only a very small phase of the overall consideration of this very complicated structure which is involved in the causation of one of the dentists' most trying problems.

DIFFERENTIAL DIAGNOSIS BETWEEN ARTHROSIS OF SYSTEMIC AND LOCAL ETIOLOGY

Systemic Etiology — In cases of systemic

* Presented before The American Academy of Dental Medicine on December 7th, 1952.
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etiology, the joint discomfort becomes worse with rest and improves on chewing. Joint edema, inflammation due to allergies, nutritional deficiencies, or various forms of arthritis would act in this way.

Local Etiology — The pain and other discomforts are relieved by rest when the irritating factor is local. Mastication on the other hand, accentuates the pain and collateral symptoms.

Combined Etiology — In many cases both systemic and local factors operate with an innumerable variety of combinations. For example, a patient may arise in the morning with joint pain which is obviously not from mastication. Yet this pain may be of local origin due to displacement of the mandible by sleeping position, (pillow or hand pressed against the mandible) or due to bruxism causing the abnormally contacting teeth to create mandibular displacement with joint injury even though no apparent function has been in progress.

WHAT PRODUCES THE PAIN AND CLICKING?

Pain and clicking are not due to the same cause. It will be found by careful analysis that pain is caused by compression of the head of the condyle toward some part of the joint cavity. This may be in a posterior and upward direction which is the most frequent, in a medial direction against the inner wall of the fossa, or in rarer cases, in a forward direction against the articular eminence. Clicking, contrariwise, is due to excessive joint freedom allowing abnormal excursions. It is commonly found that the pain occurs on one side (the side toward which compression is exerted) while the clicking occurs on the opposite joint (tension side). Here the condyle rotates excessively around the painful joint as an axis with excessive excursion resulting in clicking in the opposite joint. Both pain and clicking symptoms may arise in the same joint or in both joints if compression occurs on closure and extension is permitted due to excessive freedom of opening. The latter type of problem (bilateral temporomandibular arthrogryposis) occurs most often in excessive overbite cases where the entire mandible is pushed backward on closure.

NOMENCLATURE

Arthritis — Inflammation of a joint.

Arthrodynia — Pain in a joint.

Arthrogryposis — Persistent flexure or contracture of a joint.

Arthrosis — A dysfunction of a joint.

Centric occlusion — The relation of the inclined planes of the teeth when the jaws are closed and the inclined planes of the teeth are making maximum contact.

Centric relation — The correct closed position of the mandible as related to the maxillae, regardless of tooth position. In children, this coincides with centric occlusion, but with abnormal wear or the effect of habits, faulty restoration, injury, etc., the teeth may make a centric occlusion in an incorrect centric relation.

Luxation — The head of the condyle is completely out of the fossa and can only be returned to it with difficulty.

Physiologic rest position — The relaxed position of the mandible. Normally this creates a space of about 3 millimeters between the upper and lower occlusal surfaces.

Subluxation — Partial dislocation of a joint. This may be determined by the condylar head slipping past the crest of the articular eminence but not riding up on it.

MECHANISM OF TEMPOROMANDIBULAR JOINT PAIN

Some authors have insisted that it is necessary to have nerve impingement for pain from the temporomandibular joints to occur. This is far from the case. Edema, muscular spasms or even simple fatigue from prolonged abnormal mandibular position is enough to cause severe pain often accompanied by interference with joint function. The variety of symptoms and area of referral of temporomandibular joint pain may be understood from the proximity of the following nerve branches to the joint area (not necessarily the joint itself)).

It can thus be seen that preauricular, postauricular, cephalic and cervical discomforts and pains, spasms of the muscles of mastication, paresthesias of the pharynx and tongue and alterations in salivary flow may be influenced by joint dysfunctions.

	Branch	*Nerve*	*Region Affected*
1.	Auriculotemporal	Trifacial	Temporal and Auricular
2.	Chorda Tympani (Pars Intermedius)	Facial	Submaxillary gland region and anterior part of tongue
3.	Tympanic (Jacobson's) (sensory and motor)	Glossopharyngeal and Vagus	Throat and posterior part of tongue
4.	Masticatory (masseteric) (motor)	Trifacial	Muscles of mastication
5.	Tympanic plexus	Carotid plexus and Cervical Sympathetic	Vascular

SYMPTOMS OF JOINT DISTURBANCE THAT WILL GUIDE THE PRACTITIONER TOWARD INDICTMENT OF THE JOINT AS A CAUSE OF THE SYMPTOMS

1. *Tenderness to pressure* — The practitioner should press the index finger of each hand against the joint area on each side. A joint producing pain symptoms is usually tender to compression.

2. *Deviation of the mandible on opening*— The dentist faces the patient directly and asks him to open his mouth wide. Deviation of the mandible toward one side on opening indicates limitation of function of the joint on that side with excessive excursion of the opposite joint. As mentioned previously, the joint with limited motion (compressed joint) is usually the one with pain symptoms while the opposite joint with excessive motion (tension joint) is usually the one which elicits clicking.

3. *Clicking on palpation* — By holding the finger over the joint on opening and in various excursions, the clicks can be felt. Careful observation will indicate practically the exact position in which the clicking is created.

4. *Deviations on closure* — Careful observation on closure will usually reveal that the jaw closes in a more or less vertical arc until the teeth are contacted and then, as one or more prematurities interfere, the mandible shifts to accommodate for the abnormal centric occlusion.

5. *Tenderness when pressing mandible back manually* — By grasping the mandible firmly and pressing backward, the discomfort is produced if it arises from the joint.

6. *Excessive opening* — If the patient can open the mouth very wide, 45 millimeters or more, it may be considered that the joints are excessively free and some luxation probably occurs on opening.

7. *Difficulty on opening* — A person with referred pain radiating from the condylar region and with difficulty on opening of the mouth is most likely suffering from muscular spasm due to the temporomandibular joint syndrome. An exception may be made in cases of malignancies involving the joint, parotid gland inflammation, edema from injury or generalized arthritis or trismus due to an erupting third molar, but these can be ruled out by differential diagnosis. It should also be borne in mind that the temporomandibular joint can be a very important trigger zone in trifacial neuralgia.

TYPES OF TEMPOROMANDIBULAR JOINTS
(Modified from Riesner's Observations)

1. *Herbiverous type* — The joint fossa is very shallow, the articular eminence is very slight and the condyle is quite flat. The teeth are in an end-to-end, flat or very shallow occlusion. Lateral and protrusive movements are easily made. This type of joint is rarely involved in temporomandibular joint disturbances.

2. *Carniverous type*—The mandibular fossa is extremely deep and the articular eminence is very prominent. The head of the condyle is

quite pronounced and fits deeply into the fossa. Functional movement occurs largely in a hinge-action and very little lateral excursion is permissible. The intercuspation of the teeth is usually extremely steep with prominent cusps and an excessive overbite. While this type of occlusion can be modified into an herbiverous type by eliminating the overbite and creating a flat instead of an intercuspated occlusion, the joints cannot take the newly established freedom and severe injury with pain is a frequent finding.

3. *Omniverous type* — The fossa is fairly well pronounced with a contour midway between the herbiverous and carniverous types. The articular eminence is moderate and the head of the condyle is well rounded. This joint usually accompanies a shallow, so-called normal occlusion, with moderate intercuspation and a short average overbite.

In executing occlusal modification such as occurs in equilibration, mouth rehabilitation and denture construction, the omniverous and herbiverous types are amenable to fairly wide variations in occlusion. The carniverous type is not and should be regarded with extreme caution.

BITE RAISING

Although it is true that increasing the degree of opening by elongating the crowns of the teeth with restorations will bring the condylar heads away from the fossae and thus relieve pain, the effects are very temporary. Rapid return of the joint discomfort, depression or loosening of the teeth and other harmful sequelae usually follow excessive increases in the degree of opening. Such injuries are the resultant of impingement of the freeway space initiating continually active function with clenching and bruxism, and muscular fatigue.

The leeway for bite elevation can be determined very easily in the dental office by having the patient sit in a vertical position with an 8x10 inch roentgenographic film in an intensifying cassette held against the side of the face. The x-ray tube is placed 40 inches away at right angle to the face with a zero angulation and on a plane with the occlusal surfaces of the teeth. The patient is instructed to place the "lips together and the teeth apart" in a relaxed position. Approximately one half second exposure is given with the regular dental machine at ten milliamperes. The result will be a profile film of the patient showing the osseous tissues and teeth as well as the profile of the soft tissues of the face. The space between the upper and lower occlusal surfaces can easily be measured with a transparent millimeter rule. If the clearance is more than three millimeters, the bite can be raised to that amount. For example, if an interocclusal clearance of five millimeters is found, the occlusal surfaces can be elevated safely by two millimeters. If the clearance is only three millimeters or less, bite-raising is definitely contraindicated and dangerous.

CAUSES OF TEMPOROMANDIBULAR JOINT PAIN

The height of the occlusion should not be considered the important factor in the causation of temporomandibular joint pain. It is rather the deviations in a horizontal plane that cause the trouble. The causes may be listed as follows:

1. *Differences between centric occlusion and centric relation* — In such cases, for the teeth to assume maximum centric contact, the mandible must deviate, thus throwing the condyle heads into abnormal positions.

2. *Unopposed teeth* — Teeth without opposition tend to elongate and strike the opposing teeth in a horizontal direction. Thus, an unopposed elongated lower left third molar may strike the distal aspect of the upper left second molar on closure, causing the mandible to be thrown back. This results in joint compression and pain on that side. In another case, an unopposed elongated upper left third molar may strike the distal of the lower left second molar and cause the mandible to be compressed to the right with resultant temporomandibular joint pain on the right side. Many other variations may be seen in this type of causative factor.

3. *Opposing teeth meeting on their facial or lingual surfaces instead of in occlusion* — The simple discovery of a second bicuspid in lingual version so that it hits its opponent in a

lateral direction may reveal the cause of a very severe joint pain resistant to all forms of treatment.

4. *Malarranged teeth which extend beyond the occlusal plane* — An elongated first molar which had not been reduced before an opposing bridge was made can be the cause of joint disturbance by its pressure against the opposing mesial or distal abutment teeth in a sidewise direction. A similar effect is created when the tooth of one jaw erupts much before its opponent so that it is higher than the occlusal plane.

5. *Excessive overbite with firm anterior teeth* — When the mandible is wedged between firm anterior teeth at one end and the joint cavities at the other, the weaker side will give, and this is usually the temporomandibular joint. If such does not occur, the anterior teeth will migrate.

6. *Bruxism* — Clenching and gritting the teeth, especially if malocclusion exists, may cause temporomandibular joint disturbances.

7. *Unilateral mastication* — When, because of decreased efficiency on one side through loss of teeth, hypersensitivity of a tooth, occlusal disharmony or habit, the patient chews constantly on the more efficient and comfortable side, temporomandibular joint pain is invited. The side affected is the *used* side because it is the side of joint compression. An exception to this rule would be pain occurring on the extension side in the carniverous type of markedly concave joint wherein the head of the condyle impinges on the articular eminence on that side.

8. *Habits* — Frequent pressing of the mandible by the fist or constant irritation of the joint by abnormal mandibular position, e.g., tongue-twisting to feel a space, cavity or rough edge of a tooth in the molar region is sufficient to cause joint irritation. Some individuals like to push the mandible with the fist, rest on it, or are continually moving the mandible in abnormal directions.

9. *Sleeping position* — Compression and injury of the joint may occur due to displacement from medial pressure directly against the joint by the pillow or hand or may effect irritation of the alternate joint by compression against the body of the mandible causing it to twist toward the opposite side.

Those listed are only a few, albeit the most important, local causes of temporomandibular joint disturbances. The alert operator can discover many variations of the above basic causes. The arthrodynia may be, and usually is, precipitated by some trauma such as excessive opening on yawning, a blow on the jaw, the placement of a filling out of harmony with the occlusion, excessive opening or strain on the joint during an extraction, orthodontic treatment for cervical arthritis or injury when the mandible is employed as anchorage.

TREATMENT FOR THE RELIEF OF TEMPOROMANDIBULAR JOINT SYMPTOMS

Emergency Relief

Alleviation of acute symptoms may be obtained by one or more of the following:

1. *Shifting of mastication* to the opposite side so as to draw the affected condyle away from the fossa wall. The exception would be in those cases where the compression is caused by the head of the condyle being displaced anteriorly against the articular eminence instead of in a posterior or medial direction.

2. Institution of a habit of *"lips together teeth apart"* to recreate the free-way or interocclusal space and thus return the condyle heads to their correct relaxed positions. This also relieves muscular spasm and aids in the cure of bruxism.

3. *Nutritional fortification* — 500 milligrams of ascorbic acid and 50 milligrams of thiamin chloride daily will aid in the reduction of joint edema and raise the pain threshold.

Medication — Mephenesin in doses of .5 to 2 grams daily will create muscular relaxation, reduce or eliminate bruxism, and will often relieve the joint pain itself. Salicylates may also be employed for temporary relief of the joint pain until the causes are eliminated.

5. *Endocrine therapy* — Hydrocortisone (compound F) can be injected directly into the joint for the temporary relief of pain. This method should be used only when the previous

methods have been unavailing. Contraindications for cortisone should also be considered prohibiting the use of hydrocortisone.

6. *Physiotherapy* — Application of heat over the affected joint area often relieves muscular spasms. Sinusoidal faradic current may be used for the same purpose.

7. *Psychotherapy* may be necessary to break habits such as bruxism, mandibular displacement and various abnormal biting actions or to adjust patients who have suffered joint pain over a period of many months or years.

PROLONGED RELIEF

For the complete relief of temporomandibular joint pain one or more of the following procedures are necessary:

1. Rendering of *centric occlusion and centric relation* synonomous by eliminating prematurities.

2. *Extraction of unopposed teeth* for which antagonists cannot or will not be supplied.

3. *Equilibration of occlusion* to create free innocuous bilateral function.

4. *Orthodontic correction* to bring into alignment malaligned teeth which cause horizontal displacement of the mandible.

5. *Restoration of missing teeth* to improve efficiency so that mastication may be efficient and comfortable and alternated between both sides.

57 West 57th Street

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SHOREHAM HOTEL, WASHINGTON, D.C.

(See pages 64-65)

UNUSUAL CAUSES FOR PAIN IN THE FACE*

Nathan Savitsky, M.D.

I should like to thank you for inviting me to discuss the problem of pain in the face from the neurologic and psychiatric standpoint. Such interdisclipinary exchange of ideas is usually very fruitful and emphasizes again that there is really no strict division of subject matter but rather a division of labor.

I do not intend to review what is already well known to most of you about trigeminal neuralgia and its varied clinical manifestations or about unerupted teeth and retained roots as causes of facial pain and headaches and facial pain of obscure etiology due to dental infections. I intend to present in brief case histories from my practice of a few unusual causes for facial pain. Facial pain due to autonomic disturbances will not be discussed.

I. RHEUMATOID FACIAL PAIN—MYALGIA OF FACIAL MUSCLES

Rheumatoid involvement of the muscles around the head is not an infrequent affection. The muscles in back of the head and neck are usually involved. These muscles are painful and tender to pressure. There may be rheumatoid manifestations in other parts of the body. Patrick[1] in 1918 called attention to this affection and named it chronic indurative rheumatic headache. The pains may recur for many years. During the past few years there has been considerable emphasis by Williams,[2] Seydell,[3] and Randolph[4] on the probable role of allergy in accounting for these pains in muscles around the head. Sydell in his summary of indurative myalgic headache in 1940 stated that a few cases with severe pain in facial muscles had been reported at that time.

Case 1. A 34 year old woman was seen during October 1944 complaining of pain in the right side of the face for 8 years. She described the pain as recurring irregularly in and around the mouth with less frequent pain in the head, particularly in the occipital region on both sides. The pain was said to be a real ache, worse during inclement weather and on exposure to cold. All her upper teeth had been removed in an attempt to relieve the pain. She told of frequent epigastric distress during exacerbations of facial pain and of intensification of pain in the face during periods of emotional upset.

There was a history of neurotic symptom formation for which she had seen a neuropsychiatrist on and off since her 18th year. She was almost constantly tense and insecure. There was a history of recurrent pain in the lower limbs for about 5 years.

The objective examination showed no evidence of acute or chronic disease of the internal organs; the blood pressure was 94/60; there was tenderness of muscles of the face, particularly on the right side, and deep muscle tenderness in the right suboccipital region; the right sternomastoid and trapezius muscles were markedly tender. Head movements were supple. The right biceps and both calves were markedly tender. There was no evidence of organic disease of the nervous system. There were no sensory or motor changes in the fifth distribution; the corneal reflexes were intact.

Among four hundred cases of indurative or chronic headache seen during the past 20 years, there were only 3 cases in which the pain in the face was in the foreground of the clinical picture. A careful study of the history in these 3 cases revealed other rheumatoid tendencies. The examination in each case showed ample evidence of rheumatoid disease in other parts of the body.

II. SYPHILIS OF THE FIFTH NERVE

Syphilis involving only the fifth nerve and giving rise to facial pain and numbness is

* Presented at the American Academy of Dental Medicine, December 7, 1952, New York City.

apparently very rare but not unknown. Such a case is mentioned in Nonne's encyclopedic work on syphilis of the nervous system.[5] Israel Strauss[6] reported a few cases a short time ago. In the two following cases there was no other evidence of syphilis of the nervous system. In neither case was there a personal history of venereal disease or of treatment for it.

Case 2. A 44 year old widow was seen during October 1934 because of a bitter sensation in the mouth, burning in the left upper gingiva and severe pain in the left upper jaw for 7 months. The onset of the present illness occurred after an upper molar was filled. Pain and paraesthesiae became more pronounced after this tooth was finally removed about 6 weeks before she was seen. Numbness in the lower part of the left side of the face appeared 3 weeks before she was examined. She did not complain of difficulty with chewing.

The most significant fact in the patient's past history was that her husband had had syphilis. The physical examination showed nothing in the mouth to account for her discomfort. The neurologic examination showed only diminution of all modalities of superficial sensation in the lower two divisions of the 5th nerve on the left side; there was tenderness over the left masseter, and a slight tendency of the jaw to deviate to the left. The pupils were equal, regular and reacted well to light and in accommodation. The blood Wassermann was 4+. Lumbar puncture showed 12 lymphocytes, a total protein of 47mg.% and negative Wasserman and colloidal gold tests. Antiluetic treatment resulted in prompt and persistent relief.

Case 3. A man of 34 was seen on September 29, 1934, complaining of pain in the left side of the face for a few weeks. The pain was preceded by numbness in the face which began during July 1934. The pain in the face became increasingly severe, was more or less constant and worse at night, interfering with his sleep. He also reported some difficulty in chewing on the left side for about a year. There was no history of venereal disease and no previous attacks of pain in the face were reported. The neurologic examination showed diminished sensation involving all superficial modalities strictly confined to the left 5th nerve; the mucous membranes were also involved. The sensory changes were more marked in the lower two divisions of th 5th nerve. There were no trigger zones; the jaw deviated to the left side on opening the mouth. Pupillary reactions were normal. The blood Wassermann was negative but spinal fluid serology was positive for syphilis.

III. CERVICAL RADICULITIS

Pain in the neck extending up to and including the angle of the jaw may be due to an affection of the C-2 root. The patients usually complain of pain in back of the head. Occasionally the pain is mainly in the region of the angle of the jaw. Numbness and other paraesthesiae are usually present. The sensory changes conform to a radicular pattern.

Case 4. A 47 year old school teacher was sent for a neurologic examination because of pain in the left side of the neck, most marked near the angle of the jaw. There were also frequent stabbing aches behind the left ear. She also told of recurrent creeping sensations and tightness in the left shoulder and left arm. The neurologic examination showed hyperalgesia, hyperthermaesthesia and hypaesthesia in C-2 and 3 on the left. There was no doubt about the root changes. There was no evidence of spinal cord involvement; no sensory changes were demonstrable in the 5th distribution. There was some intensification of pain with straining. X-ray examination of the spine showed hypertrophic changes in the bodies of the 5th and 6th cervical vertebrae. An x-ray diagnosis of arthritis was made.

Evidence has been accumulating since 1927 that pathologic changes in the cervical spine can cause headaches, dizziness, tinnitus and even pain in the face. Newirth[7] recently pointed out that headaches and facial pain are sometimes seen with cervical discs. Facial pain was reported by Roger[8] in patients with cervical spine injuries. These headaches, dizziness and facial pains are probably due to involvement of autonomic nerves which pass up through the spine into the skull. Changes in intracranial circulation may perhaps account for these com-

plaints. The cervical spine should be investigated in all patients with facial pain of obscure etiology.

IV. SCHMINKE TUMOR

A malignant nasopharyngeal tumor, sometimes called Schminke tumor,[9] readily spreads along the base of the brain after invading the intracranial cavity. Occasionally the initial complaint may be pain in the face. In a few weeks to a few months, other complaints indicate probable involvement of the middle fossa. The presence of conduction deafness on the side of facial involvement should make one suspect a nasopharyngeal tumor. Deafness is usually due to compression of the eustachian tubes. Double vision soon appears due to involvement of the 6th or 3rd nerves at the base of the brain. Temporary relief is sometimes obtained with deep x-ray therapy.

Case 5. A 45 year old housewife was seen during January 1940. Her illness began with pain in the region of the right jaw and difficulty in opening her mouth. Three months after the onset of the illness she began to complain of more extensive pain in the right side of the face, right-sided deafness and fullness in the right ear. Three weeks before she was seen, double vision on looking to the right appeared. Pain in the face grew progressively worse. The objective examination showed impaired non-dissociated sensation throughout the entire trigeminal distribution, paralysis of the right 6th nerve and a right central facial weakness. Lumbar puncture showed a total protein of 62mg.% with negative serologic reaction. Direct observation of the nasopharynx showed a tumor which on biopsy proved to be an infiltrating embryonal cell carcinoma. There was marked improvement objectively and subjectively after exposure to deep x-ray therapy.

The first manifestation of other malignant tumors may also be pain in the face, often with accompanying numbness. The primary tumor may often be found only after prolonged investigation. The tumor sometimes metastasizes to the region of one of the foramina through which the branches of the fifth nerve pass. The pain is usually limited to that branch and is rarely paroxysmal. The presence of numbness and objective sensory changes rules out a trigeminal neuralgia.

V. MENINGIOMA IN THE CEREBELLO-PONTINE ANGLE

Pain in the face may sometimes be due to pressure on the fifth nerve by a slowly growing benign tumor at the base of the brain. The tumor may arise from the fifth nerve anywhere along its course at the base of the brain in the middle.[10] or posterior fossa.[11] The only manifestation of such a tumor for a long time may be pain in the face, teeth or gingiva.

Case 6. A 50 year old housewife seen for the first time on June 11, 1946 complained of recurring severe pain in the gingiva for about 5 years. Numbness of the right lower lip was present for only 3 days at the time of onset. Diminution for pain, touch and temperature in the distribution of the right 5th nerve was found; the right corneal reflex was diminished. About a month later, a functional left hemisensory syndrome was noted. On 6/11/46, she began to complain of defective hearing on the right side. Inner ear deafness was found and there was dizziness with conjugate lateral gaze to the right. The possibility of a tumor of the right angle, probably arising from the 5th nerve, was considered. The patient was hospitalized on August 4, 1948 and discharged on August 22, 1948. Caloric tests showed normal vestibular responses. No sensory changes were found in the 5th distribution. A diagnosis of trigeminal neuralgia was made. The mandibular distribution of the right 5th nerve was blocked with alcohol and she obtained relief for 2½ years.

The patient was re-examined during September, 1952, because of the frequent recurrence of sharp pain lasting only a few seronds in the right side of the face. In between attacks, the right side of the face felt hot. The pain often came on when eating and chewing. There were periods of freedom for no evident reason which lasted up to two weeks. The hearing defect on the right side was still present; she complained of buzzing in that ear. A neurosurgeon had refused to give her another alco-

hol injection. Psychiatric treatment was advised. The examination showed diminution for pain, touch and temperature in all 3 divisions of the right 5th nerve, a diminshed right corneal reflex and definite right-sided inner ear deafness.

The patient was rehospitalized early in October, 1952. X-ray of the skull showed marked hyperostosis of the right petrous bone. A diagnosis of a tumor of the right angle was made and an operation was performed on October 17, 1952. A tumor which proved to be a meningioma was removed from the right cerebello-pontine angle.

Tumors in the cerebello-pontine angle apparently can cause pain in the face which simulates trigeminal neuralgia. The appearance of numbness and of objective evidence of 5th nerve involvement was against the diagnosis of trigeminal neuralgia. The nerve deafness and hyperostosis of the petrous bone indicated the probability of an expanding lesion in the region of the right cerebello-pontine angle. The patient had been depressed for a long time because of the death of a son. Throughout the period of observation she admitted continuous pre-occupation with thoughts about death and feelings of regret about her son. On one or two occasions, there was definite evidence of psychogenic superimposition (burning in the face) and during one examination a functional hemisensory syndrome was demonstrable on the left side.

VI. CHARLIN'S SYNDROME OR NEURITIS OF THE NASAL NERVE

Neuritis of the nasal nerve is a relatively rare affection. It was described by a Chilean ophthalmologist, Charlin, in 1931.[12, 13] The clinical picture is that of severe neuralgic pain beginning in the side of the nose and radiating toward the eye, especially to the region of the inner canthus. The pain is often accompanied by congestion of the mucous membranes of the nose, a nasal discharge and trophic changes in the cornea. In atypical or abortive cases, the pain may be limited to the side of the nose. The etiology of this condition is obscure.

Case 7. A 57 year old man seen during November and December, 1948, because of recurrent pain in the right side of the face and nose of 2 years' duration. The onset followed a "cold with a running nose" and the pain always radiated to the right eye. During exacerbations there was also pain in the right temporal region and right side of the neck. There was never any redness or tearing of the right eye and no nasal discharge during attacks. The pain was said to be sharp occasionally but dull most of the time. Emotional upset intensified the pain. In between attacks, he often felt as though the right side of the nose was clogged. His past history was non-contributory except for an allergy to dust. A rhinologist suggested a nasal operation because of deviation of the septum.

The objective examination showed some obstruction to breathing through the right side of the nose but no swelling or hyperemia of the nasal mucosa; there was muscle tenderness in the right suboccipital and surrounding regions; the right temporalis muscle was tender; no changes were noted in the anterior segment of the eye. Slit lamp microscopy was not done. Pupillary reactions were normal. The neurological examination was negative except for hyperalgesia, hyperaesthesia and hyperthermaesthesia of the right side of the nose; these sensory changes were not striking but were definite; there was no tenderness of the eyeball or inner canthus of the eye and there were no trigger zones or increase in intraocular pressure to the palpating finger. The patient responded promptly to cocaine anaesthetization of the mucosa in the right side of the nose.

The diagnostic problem in this case was difficult. This was certainly not a full blown syndrome of Charlin. No diagnosis could be made except a nasal nerve neuritis. The presence of sensory changes in the region of the nose is very unusual. The absence of congestion of the eyeball during attacks did not rule out the diagnosis. In view of irradiation of pain into the eye and the frequent presence of trophic changes in the conjunctiva and cornea, this type of patient is often seen only by opthalmologists.

VII. PAIN IN THE FACE WITH PERIPHERAL NEUROPATHY

It is difficult to account for the fact that even in the most severe and widespread cases of peripheral neuritis and toxic peripheral neuropathies, there are rarely any complaints of pain or paraesthesiae in the face. It is known that in severe peripheral neuropathies the sensory fibres supplying the face are sometimes involved.[14] This is usually demonstrable only during neurological examination. Pain in the face which was probably due to a multiple sensory neuritis was seen only once.

Case 8. A 30 year old attorney was referred because of pain in the left cheek for 6 months and pain and numbness in the left leg, left ankle and occipital region for 3 or 4 months. Examination showed patches of altered sensation in the occipital region, in the region of the left ankle and in the distribution of the external cutaneous nerve of the right thigh. There was also a patch of diminished pain, touch and temperature sensation in the middle of the left cheek. These sensory changes did not have an anatomical configuration. The only other positive neurologic finding was a late ulnar atrophy resulting from a fracture in the region of the left elbow during childhood.

Multiple sensory neuritis is a relatively rare affection involving superficial sensory nerves in various parts of the body. Involvement of the face in this illness has never been reported. There is no involvement of motor nerves. The cause of this affection is unknown. It may recur irregularly over a period of many years. It was first described by Schlesinger in 1911.[15] Wartenberg recently commented on the clinical aspects of this affection.[16] It is important to determine whether patients with pain and numbness in the face have similar discomfort in other parts of the body.

VIII. PSYCHOGENIC FACIAL PAIN

Psychogenic facial pain is relatively common. It is seen most frequently in women during and after the menopause and much more rarely in men. It is important to emphasize that the character of the pain in these psychogenic patients differs from that seen in organic cases. It is rarely a sharp pain or persistent ache but is usually described as burning, pressing, tightening, heaviness or pulling in the face. This "pain" in the face is rarely the only clinical manifestation. A careful history and psychiatric examination usually reveal other functional complaints; very often there is a long history of neurotic symptom formation. Monosymptomatic psychogenic pain in the face is unusual. Careful questioning usually reveals heaviness of the head, pressure on the top and in the back of the head, recurrent sensations of a "lump" in the throat, numbness in the extremities, etc. A depressive syndrome may be in the background. In these cases, a favorable response to psychotherapy or shock treatments is often the only proof of the psychogenic nature of the facial pain.

Case 9. A 75 year old widow was seen on April 9, 1948 complaining of pain in the upper right gingiva and right cheek of 3 weeks' duration. The pain soon spread to the eye on the same side. It was described as a burning sensation which recurred intermittently. Soon after the onset, it continued without abating for 24 hours. The burning sensations became intensified when eating solid food. There was a long history of neurotic symptom formation. She was always tense and insecure with a tendency to over-react to minor situations and to worry excessively. She was sure she had cancer when I saw her and there was considerable active anxiety but no depression. Except for mild parkinsonism involving one upper extremity, there was no evidence of organic disease of the nervous system; there were no sensory changes in the trigeminal distribution. The pain disappeared in a few weeks without treatment. The patient was re-examined during October, 1952 because of recurrence of similar burning pain since June, 1952. It began with sharp pain in the gingiva which soon became burning in nature and spread to the cheek. Nothing was found objectively except perhaps a mild trigger zone near the right nasolabial fold. This was not considered significant because she reported obtaining relief by pressing her hand tightly against her face. The pain responded readily to suggestive psychotherapy

(application of galvanic current to the face).

The presence of psychogenic pain in the face does not rule out an associated organic affection. The patient with the meningioma in the cerebello-pontine angle had burning in the face in between paroxysms of sharp pain and on one occasion, a functional left hemisensory syndrome was found, indicating the presence of significant psychogenic superimposition.

There are other unusual neurologic causes for facial pain such as syringobulbia[17] and multiple sclerosis.[18] This paper has been limited to personal experiences in private practice. The classic monograph on facial neuralgia by Wilfred Harris[19] should be read by those interested in this subject.

CONCLUSION

1. A very careful description of the pain should be obtained from the patients. Is the facial pain sharp, a real ache, or a sensation of tightness, heaviness, burning, boring or pressing? It should be ascertained how often the pain recurs, how long each attack lasts and to what factors it seems related.

2. Before proceeding with dental treatment, it is important to decide whether the pain syndrome can be related to changes in teeth, gingiva or mouth. Occasionally when the pain or distress in the face is psychogenic, such dental work may precipitate serious mental reactions.

3. One must be especially cautious when numbness is present in addition to pain. This often indicates an organic affection of the fifth nerve. It may also point to psychogenic superimposition.

4. A neuropsychiatric consultation is advisable when there is doubt about the nature of the pain syndrome or when pain persists after adequate dental treatment.

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THE THERAPEUTICS OF PAIN CONTROL

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Pain receptors, activated by irritating or toxic stimuli, transmit painful warnings of varying intensity and duration. The pain may be "faint and fleeting or intense and incessant,"[1] but it is the most usual complaint of the patient who first applies for dental attention.

The threshold for painful stimuli is variable for the tissue as well as for the emotional response of the subject involved. Contrast, for example, the gingivae which have a low degree of sensitivity with the more sensitive areolar mucosa and the reactions to pain of a rational individual with those of a tense, fearful person.

Further, the contrast between superficial and deep pain, as described by Best and Taylor[2] is that "deep pain is not associated with protective reflexes and, when severe, is accompanied by sweating, nausea, slowing of the pulse and a fall in blood pressure. The pain is described as 'sickening.' Cutaneous pain cannot be appropriately described in this way and it is accompanied by quickening rather than slowing of the pulse, and a rise in blood pressure." These facts are of particular interest in the consideration of pain control in dental medicine.

In viewing the therapeutics of pain control, it should be emphasized that treatment with drugs is only an adjunct. Although therapeutics is generally regarded as the treatment of disease by drugs, it also covers the use of mechanical, physical and psychological methods in the prevention of relief of pain. It is generally recognized that the therapy of periodontal diseases is primarily mechanical and that their etiology, complex as it may be, is, in a great majority of cases, primarily dysfunctional and irritational.

It follows, then, that restoration of normal periodontal function by such means as occlusal shaping and equilbration, removal of supragingival and subgingival calculus, smoothing and polishing of enamel and cementum, increase of gingival circulation and elimination of periodontal pockets are the ultimate objectives in the treatment of periodontal disease. In the same way, pain induced by muscular spasms or muscle fatigue caused by abnormal mandibular posture or by naturally occurring or induced malocclusion are controlled respectively by control of the habit or by correction of the malocclusion. It is with the thought that drugs are only one means in therapeutics, that the following are presented. Special reference is made to the rationale, uses, limitations, and application of the agents.

Prevention of Operative Pain:

℞

Pentobarbital sodium cap. 0.05
Dispense twelve (12)

Label: One capsule one hour before dental appointment.

Premedication calms a tense patient and induces tranquility during dental operations. It also controls the disturbing symptoms of the stimulation of the central nervous system by local anesthetics and reduces the tendency to gagging and vomiting in sensitive persons.

Barbiturates are central nervous system depressants. Pentobarbital (Nembutal) acts for a comparatively short time and is most effective for one to two hours after administration.

Topical Anesthetic for Operative Use: Blass

℞

Sol. Zephiran, 12.5% 0.8
Oil peppermint 1.25
Benzocaine 15.0
Diethylene glycol, to make 100.0

Mix the benzocaine, oil of peppermint and solution of zephiran in a flask and heat until the solution of ben-

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zocaine is effected. Add enough diethylene glycol to make 100 c.c.

Topical anesthetics afford comfort and prevent pain following surgical procedures, extensive instrumentation, toothbrush or other abrasions or trauma of denture pressure.

Benzocaine depresses the sensory nerve endings when in contact with them. The solution of zephiran and oil of peppermint aid in the solution of the benzocaine and enhance the penetration and the anesthetic action of the benzocaine. The practical limitations to the effectiveness of topical anesthesia of the gingivae and oral mucous membrane are made up for by careful, non-traumatic instrumentation and the use of well-sharpened instruments.

The formula yields a 15% solution of benzocaine in a non-irritating, fluid vehicle that makes contact with the membranes in the presence of saliva. Its use in the manner suggested induces a satisfactory degree of anesthesia for an adequate length of time.

In subgingival curettage, a small amount of the solution is applied in the gingival sulci or periodontal pockets from the beaks of college pliers. In gingival pain from toothbrush or other abrasion or following extensive instrumentation, the solution is applied with a cotton pledget and the patient is instructed to repeat the application every three hours.

Topical Anesthetic Ointment for Home Use: Blass

℞

Benzocaine	4.0
Powd. tragacanth	1.0
Oil of thyme	0.5
Hydrophylic oint. U.S.P. to make	30.0

Mix and make an ointment.
Label: Apply every 3 hours as needed.

Benzocaine depresses the sensory nerve endings when in contact with them. Tragacanth is a soothing demulcent and adhesive for the ointment. Oil of thyme has a pleasant flavor and may also have some antiseptic action. Hydrophylic ointment acts as a vehicle and coats the irritated or abraded skin or mucous membrane surfaces to protect them from air—in mouth breathing—and from other irritants.

Analgesic for Postoperative Pain and Sedation:

℞

Acetyl salicyl. acid tab.	0.3

Dispense twelve (12)

Label: One tablet repeated every three hours.

The analgesic of choice is aspirin, 0.3 Grams —5 grains, repeated every three hours for pain or toxemia, neuralgia and arthralgia, as in inflammation of the temporomandibular joint. Care must be taken to determine if allergy or idiosyncracy to the drug is present, because "it may cause urticaria and dangerous acute edema of the respiratory passages and sometimes of the face in susceptible individuals."[3]

℞

Codeine sulphate	0.015
Acetyl salicyl. acid	0.3
Caffeine citrate	0.06

Mix and make 12 such capsules.
Label: One capsule repeated every three hours.
(Note: The Harrison Narcotic Law requires that a prescriber shall state on the prescription his name, address, and federal narcotic registry number and the name, address and age of the patient.)

Codeine is a central nervous system depressant having a specific action to raise the threshold of pain perception and to prevent the fear and anxiety accompanying pain. It is useful for controlling the steady, continuous pain of inflammation, trauma or infection. Aspirin synergizes the analgesic effect of the codeine and caffeine stimulates the respiratory center to overcome the respiratory depression of codeine.

Analgesia is afforded in ninety minutes by this compound and lasts for three hours, therefore more frequent administration is unnecessary.

Desensitizers for Dentin and Cementum:

Solution of formaldehyde, 40%
Silver nitrate solution, 50%

℞

Sodium fluoride	10.0
Kaolin	10.0

Glycerin to make a paste[4]

These substances act by precipitation of protein. It is believed that the precipitates formed prevent pain impulses from being carried to the pulp.

In cervical, occlusal and incisal sensitiveness, solution of formaldehyde or the sodium fluoride paste is applied with a small rubber polishing cup.

A small drop of the liquid or paste is placed in the cup held in the engine handpiece. The cup is held against the tooth surface and the engine run at full speed. When a sensation of heat is reported by the patient, the application is stopped, the tooth is allowed to cool and the area is washed free of the drug.

In approximal sensitiveness due to advanced alveoloclasia and gingival recession, the silver nitrate solution is applied with a cotton pledget, left in place approximally for a short time, and is followed by a eugenol and zinc oxide pack, which is allowed to remain for three or four days. The eugenol in the pack reduces the silver nitrate while the pack keeps the area free of food and other detritus until interproximal sanitation can be carried out painlessly.

Care in Application: Solution of formaldehyde is highly irritating to the gingivae and mucous membrane and its use may cause the usual symptoms of irritation, such as reddening, inflammation and necrosis. Silver nitrate is also caustic and an irritant to the soft tissues. If application to cementum or dentin is intended, the soft tissues should be protected by the use of cotton rolls.

After accidental application of solution of formaldehyde to soft tissues, ammonia water or aromatic spirits of ammonia should be applied and the area should be rinsed with water. In the case of silver nitrate, a solution of table salt, 1 teaspoonful to a glassful of water, is used as a mouthwash.

Dentifrice for Sensitive Dentin and Cementum: Blass

This liquid dentifrice is of use in preventing toothbrush abrasions of the teeth or soft tissues and in relieving sensitiveness of the cementum or exposed dentin surfaces.

℞

Powdered castile soap	7.5
Soluble saccharin	0.3
Powdered trioxymethylene	1.0
Glycerin	25.0
Spirit of peppermint	12.5
Powdered tragacanth	2.0
Distilled water	75.0

Mix and make a solution.[5]
Label: Use ten drops on a dry brush as a dentifrice after meals.

Solution of castile soap is detergent and lubricates the toothbrush bristles to prevent abrasion. Trioxymethylene reduces cemental or dentinal sensitiveness by precipitating protein in the dentinal tubules to prevent pain impulses from being carried to the pulp. It also promotes cornification of the gingival epithelium. Spirit of peppermint acts as a solvent and flavoring agent and tragacanth acts as a demulcent and as a gum to thicken the solution for ease in use.

Hot Water Irrigation for Infection, Inflammation and Relief of Pain:

A hot water irrigator may be used in physiotherapy.[5] Local heat treatment increases local blood and lymph circulation and local tissue metabolism. It promotes resorption of products of inflammation, permits restoration to normal function and relieves pain. This effect is brought about by dilatation of the blood vessels, thereby promoting better peripheral blood flow and causing a more rapid exchange of metabolic products between the blood and cells. The hot water irrigator offers an excellent means of assuring these desirable effects.

However, a review of the literature on the effects of heat and cold application by Spangenberg[6] led to the conclusion that the relief of pain seems to be the only reason for the use of thermal agents.

Uses and Application: This treatment is used in any stage of necrotic gingivitis, catarrhal stomatitis, parodontal abscess and acute gingival and oral infections. The last named are treated symptomatically and mechanically to restore normal function and remove irritants. In these cases, attention is also directed toward the elimination of the temperature rise and the anorexia by administering a saline laxative or cathartic. This may be 1 tablespoonful of magnesium sulfate (Epsom salt) or one teaspoonful of sodium and potassium tartrate (Rochelle salt), dissolved in a glassful of water, preferably administered on an empty stomach in the morning. The action of the saline cathartics under these conditions normally takes place within from two to four hours. A bland, non-irritating diet rich in diluted fruit juices, cooked vegetables and milk is prescribed, as in necrotic gingivitis. The non-specific micro-organisms, destroyed soft tissue and food débris are removed by hot water irrigation used every three to four hours, or as often as every half-hour if the severity of the infection demands it.

The greatest and most rapid improvement is made when the patient is taught the use of water sufficiently hot, and if he employs the method properly at home. For this purpose, a fountain syringe hung 2 feet above the level of the head as it is inclined over a wash basin is employed. A glass medicine dropper is placed at the end of the tubing. Two quarts of water, as warm as can be tolerated by the patient (usually 115° F.) is placed in the container, and 1 tablespoonful of salt and, if desired, an equal amount of sodium bicarbonate are dissolved therein. The solution is then allowed to flow into all parts of the mouth.

Rinsing alone is valueless, since water from a drinking glass touching the lips cannot be used so hot as can be tolerated by the mucosa.

Psychological Factors in Pain Control:

Beside confidence in the dentist's skill and ability, the patient must feel secure in the feeling that the dentist is personally interested in him and in his problems. It takes years of study to determine the personality status of a patient and uncovering the basic causes of personality faults is not the dentist's function. But it is helpful in understanding the patient to observe his reaction to past dental experiences and to obtain a complete history. This is facilitated by permissive listening which does not criticize, censure nor probe unnecessarily.

A useful psychophysiological test that frequently gives information about individual pattern of reaction to pain is the breath-holding time. This test, orginated by A. N. Drury and quoted by Draper,[7] has the patient take a deep breath and hold it as long as possible, while it is timed. "The average healthy person will hold his breath, in spite of uncomfortabe sensations for at least thirty and often as long as sixty seconds. Some individuals, without heart or lung disease, will give up their effort after ten or fifteen seconds, even though they are repeatedly urged to persist. They say that they were made short of breath, or their head felt full, or that their heart began to pound or that they 'just couldn't stand it any longer'. This kind of behaviour in response to breath-holding reveals a great sensitivity to uncomfortable visceral sensation, or an emotional reaction arising from the patient's fear that the symptoms constitute a serious threat to his survival. It suggests that the patient will show a similar kind of response to any spontaneously occuring awarness of visceral activity, and that his report of such symptoms must be carefully weighed in the light of his personal reaction quality." Draper further recommends the necessity for appraising the patient's manner of communication and the emotional and intellectual qualities that enter into his interpretation of his painful stimuli. He states that "If the student keeps in mind this kind of individual variation, he will not be misled into an overemphasis of complaint of pain by an extremely sensitive person or an undervaluation of a mild reaction by a stoical individual."

Attention to his own sensitiveness in dealing with the patient in pain and to the psychological means for determining the patient's reaction to pain equips the dentist with a valuable objectivity in his appraisal of the condition he is facing. Keeping in mind individual variation and using the various modalities in the thera-

peutics of pain control that are at his disposal, the dentist renders a service for the patient who can never forget its benefit.

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ULTRAVIOLET RAYS AID DIAGNOSIS

A new method for examining a tooth's structure under ultraviolet rays was described recently by four dental scientists in The Journal of the American Dental Association.

When teeth are exposed to ultraviolet rays, details in structure show up that are not visible by any other means, the report said, and every tooth is found to have an individuality of its own.

The teeth fluoresce—or give out visible light—revealing details that may provide additional information about the mechanism of tooth decay, the dental scientists said.

The report was made by Dr. I. C. Schoonover, chief of the dental research laboratory at the National Bureau of Standards; George Dickson, physicist with the laboratory, and Dr. A. F. Forziati and M. E. Lawson, Jr., research associates of the American Dental Association at the National Bureau of Standards.

The scientists said that the color and intensity of the fluorescence not only show variances between teeth of one person and those of another but between one tooth and another in the same mouth.

They explained that since the fluorescence of a substance is sensitive to small differences in structure or composition, they believe that a thorough investigation of the fluorescence of the teeth will reveal details of structure not disclosed by other methods.

They said a study is now being made to determine the fluorescent colors of extremely small portions of teeth.

THE TREATMENT OF CANCER OF THE ORAL CAVITY
(An Outline)

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INTRODUCTION

The author's purpose in writing this paper is to emphasize the importance of the role of the dentist in the care and prevention of malignant oral disease. It is also his purpose to outline the various procedures available and to mention recent advances in technique which have largely reached widespread use since the Second World War. Surgically the advances have been characterized by increased boldness in performing radical procedures. There have also been refinements in radiation technique which will be mentioned.

The cancer surgeon finds indispensable the advice and services of a pathologist, a radiation therapist and a dentist. The interested and experienced dentist performs four chief functions: 1) cancer prevention, 2) cancer detection—case finding, 3) pre-operative preparation—involving judicious extractions and treatment of oral sepsis, 4) planning and preparing prostheses in those cases where resection of bony parts is contemplated.

All malignant cases are followed at intervals whether treated by surgery or not. This is done in a systematic and regular way and is continued for at least ten years. The necessity for this is so obvious that one need not belabor the point.

Our treatment of oral cancer is primarily surgical but this in no way minimizes the importance of the advice and services of a good radiotherapist. In some clinics surgeons prescribe and administer their own radiation therapy. We prefer to delegate this to a full-time specialist.

DIAGNOSIS

The office of every physician or dentist should be a cancer detection clinic. All cancers at some early stage in their development are curable. The blame for delay in diagnosis must be shared equally by the public and the medical profession. Successful treatment must follow the dictum of the American Cancer Society: *"Early suspicion, adequate diagnosis, efficient treatment."* Over half our cancer patients have suffered delays of one to twelve months from the time they consulted a member of the medical profession until adequate diagnosis was made.

The mouth must be systematically examined by direct vision and by the palpating finger. This is particularly true in cases of unexplained enlargement of the cervical lymph nodes. A thorough description in writing of all ulcers, tumors and patches of abnormal mucous membrane should be made.

An *ulcer* is always palpated. Any underlying induration is suspect. If there are multiple ulcers they are probably infectious. The most common cause of ulcer is mechanical—broken teeth or ill fitting dentures. These conditions can be readily corrected. Painful ulcers are usually infectious in orgin but infected carcinomas are painful. Our policy in such cases is to recommend the following: 1) a complete blood count to rule out systemic disease, 2) a Wassermann test, 3) local therapy to correct mechanical irritation, 4) oral prophylaxis to improve mouth hygiene, 5) antibiotics, 6) saline mouth washes every hour and particularly after meals, 7) no smoking, 8) avoidance of hot or heavily spiced foods, 9) large doses of Vitamin B. The patient should be observed at frequent intervals and if the ulcer is not healed in two or three weeks a biopsy must be performed.

Leukoplakia is a benign condition of the mucous membrane characterized by hyperkeratosis of the squamous layers. The white color is due to maceration of this heaped up material.

* Chief, Head and Neck Clinic, New York Eye and Ear Infirmary.

A leukoplakia patch may be so thin as to be scarcely distinguishable from the surrounding mucous membrane or it may be so thick as to have a shaggy papillary appearance. It is common in luetic stomatitis. It is a precancerous lesion and under certain conditions malignant degeneration takes place. This carcinogenic tendency is aggravated by irritants, mechanical, thermal or chemical. We, therefore, see these patients in our follow-up at regular intervals. They are treated as described above for ulcer except that antibiotics are rarely necessary. A

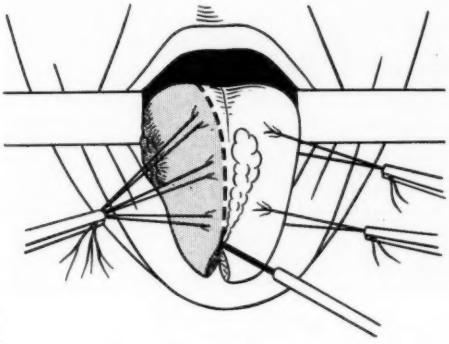

Fig. 1—Technique of hemiglossectomy for carcinoma of right side of tongue using electrocautery. Note use of traction sutures and wide margin of excision. (From Annals of Surgery)

small area of induration is the first sign of malignant change. Soon a small ulcer appears with slightly raised or rolled edges. If such an ulcer does not disappear promptly with intensive treatment, it must be biopsied.

BIOPSY

The ideal biopsy specimen is taken with a scalpel. A radial wedge of tissue is excised. It should contain a bit of the central portion of the tumor or ulcer, a bit of margin and enough of the adjacent normal mucosa so that the pathologist can get some idea of the invasiveness of the tumor. This is readily done with procaine infiltration and is preferable to the use of biopsy forceps. One or two silk sutures are placed to control bleeding if necessary. In some inaccessable lesions of the posterior third of the tongue and oropharynx the biopsy forceps is used. Care must be taken to include the growing margin of tumor. A small bit from the necrotic center of an ulcer is worthless. We have not used the techniques of exfoliation cytology in the diagnosis of these accessible lesions. Surface scrapes can be studied and probably are of value in screening large numbers of cases. Diagnosis based on such evidence should always be confirmed by formal biopsy before definitive treatment is begun and in any case where the cytological diagnosis is at variance with the clinical impression.

HISTOLOGICAL TYPES OF ORAL CANCER

By far the most common type is squamous carcinoma (Fig. 1.) These are tumors whose rate of growth, invasiveness and metastasizing propensity vary considerably in different portions of the mouth. This lack of constancy affects the plan of attack as we shall see. Also of epithelial origin is the adamantinoma which derives from the enamel organ of the tooth. This is a tumor of low grade malignancy, destructive of bone, but metastasizing rarely. It recurs locally unless completely removed. In the oropharynx we find the lymphoepitheliomas, highly radiosensitive, and of confusing histological appearance. Willis[1] believes them to be anaplastic carcinomas. A rare epithelial tumor is the adenocarcinoma of salivary gland origin, highly malignant and refractory to most forms of treatment.

Malignant tumors of connective tissue origin are less common. These include osteogenic sarcoma, fibrosarcoma, leio- and rhabdomyo-sarcoma and other rare forms. Lymphosarcoma is radiosensitive but the remainder are treated by surgery.

TREATMENT

General Considerations The concept of the cancer field is important and forms the basis of the mode of our attack on these malignant tumors. The cancer field consists of the primary

tumor with its immediately contiguous areas, the lymph vessels draining this area and the lymph nodes in which these channels terminate. For any given type and location of tumor the cancer field can be defined accurately on the basis of experimental work involving the injection of lymphatics and on the basis of many years' observations on the clinical behavior of large number of cases. In the ideal case the cancer field is kept inviolate, that is to say the primary lesion, intervening lymphatic vessels and regional nodes are removed *en bloc*. Such an operation is said to be done in continuity. As we shall see later such an operation is not always practical and may involve undue sacrifice of normal structures.

Under certain circumstances and particularly in the earlier stages of the disease it is practical and effective to resect the primary tumor and the regional lymph nodes in a discontinuous fashion. This involves a technical violation of the cancer field in that the intervening lymph channels are not removed in their entirety and are actually transected by the operative procedures. The reason such a mode of attack, often done in stages, can be successful is that lymph node metastasis occurs by embolization. Cells and groups of cells break off from the parent tumor and course down the lymphatics to the regional nodes where they are filtered out. The vessels themselves are not involved in cancerous growth. This embolic spread occurs during the earlier stages of the disease and under normal circumtances in a typical fashion. When the regional nodes become blocked by tumor, as they do in advanced cancer, two things occur. In the first place the lymph channels, heretofore clear, become involved by permeation. This means that there is a continuous strand of tumor cells growing along the lymph vessel. It is obvious such a vessel must be removed if cure is to result. The second result of blocked lymph nodes is that the lymph flow seeks other, atypical directions and widespread metastasis usually takes place. This is one of the penalties of delay in diagnosis.

Carcinoma of the oral cavity remains localized above the level of the clavicles for long periods of time and the great majority of those dying of the disease show no metastases in other parts of the body. Occasionally, however, veins are invaded in the advanced stages of the disease and distant metastases will take place. Arteries are never so penetrated.

Sarcoma of the oral bony and soft parts (with the exception of lymphosarcoma) rarely invades the lymph system and metastasis usually occurs by way of the blood stream. The cancer field does not include the regional lymphatics, and therefore, a radical local excision is usually adequate.

Fig. 2—Partial mandibulectomy for squamous carcinoma of floor of mouth adherent to inner alveolar surface. Transverse external mucous membrane incision is made with electrocautery.

Resection of the cervical lymph nodes is recommended in many cases whether or not the nodes are clinically enlarged. Experience[2] has shown how inaccurate the appraisal of early lymph node involvement can be. Late in the disease when hard, fixed masses are present the condition is obvious. The type and extent of node dissection will be outlined below.

TREATMENT OF CANCER OF THE LIPS

Squamous carcinoma of the lips is the most common oral cancer, arising on their vermilion portion and about 98% of the time on the lower lip. The reason for this marked predilection to the lower lip is somewhat obscure but may have to do with exposure to the actinic rays of the sun. The upper lip, being more sheltered, is not so exposed. Victims of

lip cancer commonly have poor mouth hygiene and are usually from poor economic backgrounds.

In its early stages and particularly when associated with leukoplakia, cancer of the lip may be intraepidermal, confined within the skin and not yet invading the underlying muscle. Such a case is treated by mucous membrane ex-

Fig. 3—Partial mandibulectomy. A transverse cut through selected level is made with the Stryker saw. The inner cortex is taken at a deeper level and in continuity with contents of floor of mouth.

cision whereby large areas of the vermilion portion of the lip can be excised with a minimum of deformity. Node dissection is not done but careful follow-up is instituted.

More advanced lip cancers are treated by a full thickness "v" excision of the lip. One-third or more of the lip can be removed in this fashion. The cosmetic results are good and prompt healing with an adequate opening ensues. If the cancer is ulcerated, invades the muscle or is greater than 1.0 cm. in diameter a limited node dissection is usually advised by us whether the lymph nodes are palpable or not. (Others do not follow this aggressive plan[3, 4] and prefer to observe their patients closely. These surgeons perform node dissections in cancer of the lips only if the nodes are clinically enlarged.) The lymph drainage area for cancer of the lip comprises the submental and submaxillary triangles. This is the bilateral suprahyoid neck dissection and is done at the time of removal of the primary tumor. It has been shown[5] that 14% of the cases without node enlargement who are submitted to this procedure show malignant lymphatic involvement. The treatment of advanced lesions requiring removal of the greater part of the lip and complicated plastic repair is beyond the scope of this paper.

TREATMENT OF CANCER OF THE BUCCAL MUCOSA

This is a less common tumor. Large areas of the buccal mucosa may be involved but often the growth outward is limited by the muscles of the cheek so that the full thickness of the cheek is not involved. Treatment is by wide excision of the primary lesion and closure of the defect with a split graft if necessary.

Neck dissection is recommended whether or not the nodes appear enlarged (Fig. 5). The lymph drainage area for the buccal mucosa lies between the mandible and the crossing of the omohyoid muscle over the internal jugular vein. This entails the "upper neck dissection" de-

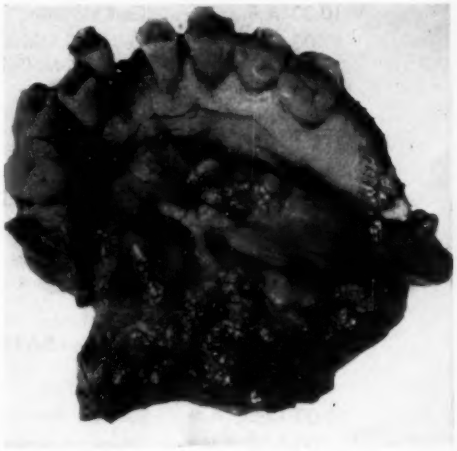

Fig. 4—Partial mandibulectomy. Operative specimen showing ulcerated carcinoma of floor of mouth. Note wide margin of excision including muscle tissue from under surface of tongue and floor of mouth.

scribed by Semken.[6] It is also called the omohyoid or supraomohyoid neck dissection. Node dissection is not done unless or until we are reasonably sure that the primary tumor has been completely eradicated. Following surgical removal of the primary tumor an experienced

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NUTRITION

THURSDAY, JUNE 25th

6:00 P.M.	Registration
8:00 P.M.	Board of Trustees Meeting
9:00 P.M.	Hospitality Party

FRIDAY JUNE 26th

9:00 A.M.	Registration
10:30 A.M.	Call to order
11:00-12:00 A.M.	Keynote Address— Elmer V. McCollum, Ph. D., Sc. D., LL. D.
12:30 P.M.	Luncheon
2:00-3:00 P.M.	"Nutrition and Calcified Tissues"— James H. Shaw, B. A., M. S., Ph. D.
3:00-4:00 P.M.	"Influence of Metabolic Disturbances in the Development of Benign and Malignant Oral Lesions"—Joseph L. Bernier, D. D. S., M. S.
6:00 P.M.	President's Cocktail Party
7:30 P.M.	Dinner—Dance Entertainment

SATURDAY JUNE 27th

9:00 A.M.	Registration
10:00-12:00 A.M.	Business Meeting
2:00-5:00 P.M.	"Medical Aspects of Nutrition" "Obstetrical Aspects of Nutrition"—Samuel Dodek, M. D., F. A. C. S. "Modern Trends in Pediatric Nutrition"— Harry H. Gordon, M. D. "Medical Aspects of Nutrition"—Milton S. Sacks, M. D., F. A. C. P.
6:30 P.M.	Cocktail Party
8:00 P.M.	Dinner—Awards to Honorary Members Elmer V. McCollum Ernestine Becker McCollum Harold Keith Box

EMY OF DENTAL MEDICINE

TION JUNE 25th — JUNE 28th, 1953

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NUTTION

SUNDAY JUNE 28th

9:00 A.M.	Breakfast Round Table Discussion "Nutrition and the Dentist" Moderator—Harold K. Box, D. D. S. Dietetics—Edward C. Dobbs, D. D. S., Baltimore Endodontics—Irving Abramson, D. D. S., Baltimore Oral Surgery—Pathology—Arthur Dick, D. D. S., M. D., Washington Periodontics—Neal W. Chilton, D. D. S., Trenton Prosthodontics—Benjamin Poster, D. D. S., Baltimore
1:00-2:00 P.M.	Luncheon—Academy Awards
2:00-4:00 P.M.	Board of Trustees Meeting

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pathologist by examination and peripheral section of the specimen can confirm the adequacy of excision. The wound of primary excision is allowed to heal and the node dissection done about three weeks later.

TREATMENT OF CANCER OF THE TONGUE AND FLOOR OF MOUTH

These areas are considered together because they pose a similar problem. The lymph drainage area here comprises all node groups from the mandible to the clavicle. This is particularly true of lesions of the anterior third of the tongue. Hence a complete neck dissection must be done. Furthermore, there is a very rich lymphatic drainage which decussates with the opposite side so that ideally bilateral complete dissections should be done. The primary lesion is removed by very liberal excision (Fig. 2 and 4). Subsequently, the node dissections are done whether the nodes are enlarged or not. Cancer of the tongue and floor of mouth grows rapidly and metastasizes early.

Where there is gross involvement of the cervical nodes a complete neck dissection is done in continuity with the primary lesion. This is the "pull-through" operation and can now be done with a considerable degree of safety with the aid of antibiotics and careful technique. The cancer field is kept intact and the chance for persistant tumor growth thereby lessened. In the past, serious mixed neck infections resulted from oral contamination. These are no longer a major problem.

TREATMENT OF CANCER OF THE JAW AND HARD PALATE

Squamous carcinoma arising over the bony parts of the oral cavity tends to remain localized for longer periods of time than tumors arising in the areas of richer lymph supply. This is particularly true of the hard palate and superior alveolar process. Hence node dissection is not done in the absence of clinical enlargement of nodes.

The primary tumor, however, must be radically removed to insure a cure. In a few cases limited local excisions of early, superficial lesions on the hard palate can be done without removal of bone. Likewise early growths involving the alveolar ridges can be treated by limited procedures with partial removal of the underlying bone. This type of work is facilitated by the use of the Stryker saw which cuts bone quickly and safely, but which will not damage the soft parts (Fig. 3). More frequently, however, radical procedures are necessary. The superior maxillectomy described by MacFee[7] is a standard upper jaw resection. The reader is referred to this paper for further details. Sarcoma and adamantinoma are treated similarly. X-rays are helpful in estimating the extent of bone involvement.

Fig. 5—Skin incision used by author for radical neck dissection with or without mandibulectomy in continuity. Skin flaps are elevated a sufficient distance to allow exenteration of the involved jaw and lymph node bearing areas of the neck. (From Annals of Surgery)

Resection of the lower jaw has been described by many authors.[8, 9] It is done for floor of mouth cancers extending onto and invading

the jaw in which case a neck dissection is done in continuity (Fig. 6). This is the combined mandible and neck dissection sometimes in the surgical vernacular called the "commando" operation. For cancer arising on the alveolar ridge where there are no enlarged nodes it is usually sufficient to remove the adjacent contents of the submaxillary triangle. Of course with any oral cancer if node involvement is present complete node dissection is done. Adamantinoma is treated by wide jaw resection, going well beyond the limit of x-ray involvement. Node dissection is not done.

It is with these jaw tumors that the dentist plays a most important role. Preoperative impressions must be taken and post-operative prostheses planned. After superior maxillectomy an upper denture with obturator gives excellent results, preventing the nasal type of speech and regurgitation of food through the nose. After lower jaw resection, a stiff wire or bar can be used to maintain the position of the fragments. A period of at least a year should ensue before any attempt to replace the defect with a bone graft is made. Most recurrences will show up by this time and it is then safe to do a secondary procedure. Special plates are made for restitution following resection of the alveolar process.

TREATMENT OF CANCER OF THE TONSIL AND OROPHARYNX

These lesions are usually far advanced when first seen, are aggressive and metastasize early. Often the presenting symptom is an enlarged cervical node. We have seen such cases where the primary tumor, lying far back in the mouth and asymptomatic, has remained undiscovered for many months. The same neglect frequently occurs with cancer of the posterior third of the tongue. Whenever cervical metastases are present or suspected thorough exploration with the gloved finger, the mirror and if necessary, the endoscope must be done. Because of their far advanced state, their surgical inaccessibility, and the early involvement of contiguous structures these tumors are frequently treated by deep x-ray therapy or radium implantation or both. Fortunately many are radiosensitive. If the primary tumor can be controlled in this fashion a neck dissection is then done. X-ray

Fig. 6—Operative specimen from "commando" procedure. Specimen viewed from underside. For advanced squamous carcinoma of right side of tongue, middle third, involving mandible; cervical metastases. Note jugular vein. Jaw resection done above angle posteriorly and at position of canine tooth anteriorly.

therapy for operable cervical metastases is not satisfactory. Two recent developments by the radiophysicist are aiding the radiologist to deliver a tumor lethal dose to these deep lying tumors without necrotizing the overlying skin. One is the use of a lead grid. This exposes the skin in checker board fashion and allows the administration of very large doses of x-ray. The second refinement in deep therapy consists in placing the patient on a rotating chair with the cancer at the axis of rotation. A very powerful x-ray beam is then concentrated on the tumor and the patient turned slowly. This spreads the skin exposure uniformly while giving maximum dosage to the tumor.

A rare early or superficial tumor in this area can be removed by local excision. In such a case access can be gained by splitting the lower lip

and cheek.[2] This incision is planned to avoid the innervation of the facial musculature, is sewn in two layers, heals rapidly and leaves a minimum of deformity.

In recent years more radical operations for these advanced posterior cases have been successfully attempted. The approach is through the neck and involves wide removal of the tonsil, mandible and cervical lymph nodes *en bloc*. These formidable procedures can now be safely attempted and satisfy the criteria of a good, radical cancer operation. The salvage rate in terms of five year arrests has yet to be determined.

SUMMARY

An outline of treatment of cancer of the oral cavity is presented. Methods of prophylaxis are discussed and a plea for early, adequate diagnosis is made. Details of operative technique are omitted from the discussion. The trend toward radical surgery, particularly in the development of procedures removing the intraoral lesion and the cervical lymph nodes in continuity is noted. New grid and rotation techniques for radiation therapy are mentioned.

127 East Seventieth Street

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7th Annual Meeting

American Academy of Dental Medicine

FRIDAY, SATURDAY, SUNDAY, JUNE 26, 27, 28, 1953

SHOREHAM HOTEL, WASHINGTON, D.C.

(See pages 64-65)

THE KERATINIZATION OF THE HUMAN ORAL MUCOSA IN THE AGED MALE*

Arthur Stone, Lieutenant Commander, D.C., U.S.N.R.†

This study was undertaken for the purpose of investigating the keratinization of the oral epithelium of aged males.

Papanicoloau[1] has demonstrated the smear technic to study surface epithelial changes in the vagina. By the use of a similar technic in the study of cytologic exfoliation of oral epithelium, it is anticipated that an index will be perfected to correlate and evaluate various changes in the oral epithelium.

REVIEW OF LITERATURE

The modern use of exfoliative cytology dates from 1917 when Stockard and Papanicoloau[2] reported this method in studying the estrous cycle in the guinea pig. The study of vaginal smears was continued in humans and Papanicoloau[3] reported the finding of cancer cells by this method in 1928. Papanicoloau[4] next directed his efforts to the application of the technic in the study of the human menstrual cycle and reported his findings in 1933. Following the above study, Papanicoloau and Traut[5] published, in 1943, a monograph on the use of the vaginal smear for the diagnosis of uterine cancer. Following a ten year study, a more complete presentation of the subject by these authors, together with Marchetti,[6] has been published.

The first report describing the use of exfoliated cells in the study of cornification as related to the oral epithelium was undertaken by Weinman[7] in 1940. He used the Wright and Gram stains to differentiate degrees of cornification in various sites of the oral mucosa.

Using the Papanicoloau technic, Miller, Soberman and Stahl[8] made a study of the oral mucosa of normal males ranging in age from 20 to 30 years. They noted that the highest evidence of cornification was found in the gingiva followed by the dorsum of the tongue; next, the parietal surface of the cheek and, lastly, the ventral surface of the tongue.

Ziskin and Moulton,[9] in 1948, used the Shorr modification of the Papanicoloau stain for comparison of oral and vaginal smears.

MATERIALS

Fifty male patients, ranging in age from 60 to 100 years, were selected for this investigation. The majority of the above patients had very few remaining teeth. However, none of the selected patients were completely edentulous or revealed gross pathologic changes of the oral mucosa.

METHOD

Scrapings of each mouth were taken with a wooden spatula from the following sites:

1. The mid-line of the anterior third of the dorsal aspect of the tongue.
2. The mid-line of the anterior third of the ventral aspect of the tongue.
3. The area of the right cheek just anterior to the opening of Stenson's duct.
4. The labial margin of the lower gingiva.

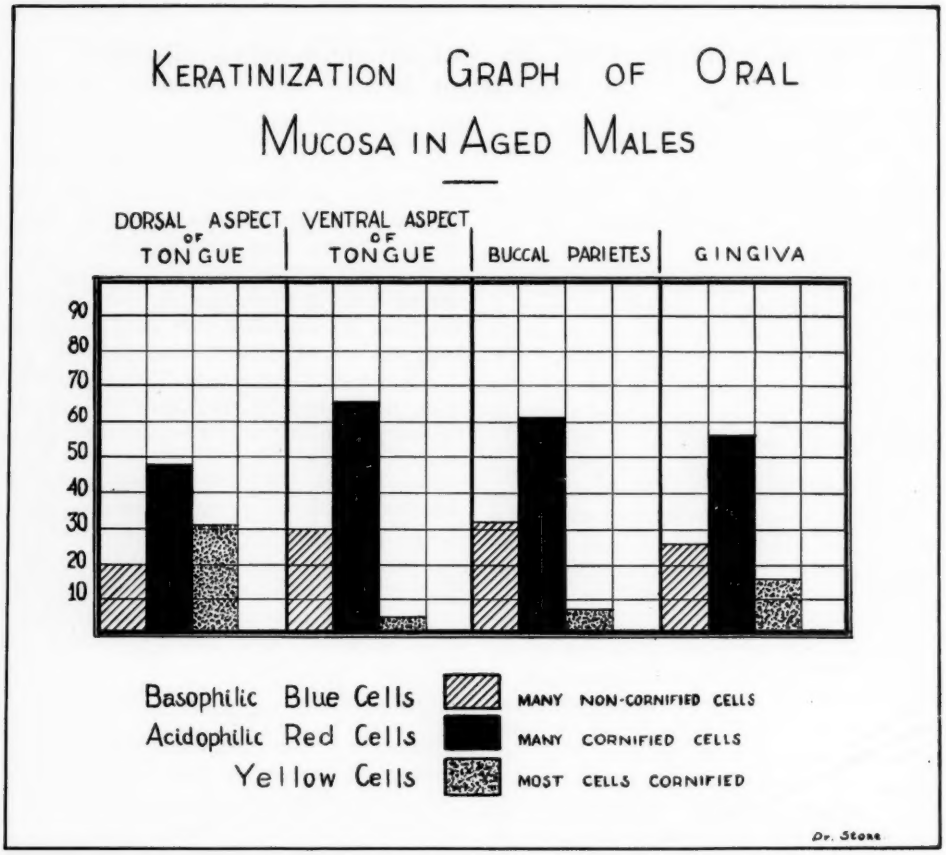
Each scraping was transferred to a glass slide and immediately immersed for fixation in equal parts of ether and 95 per cent ethyl alcohol. The two hundred slides were then stained, with slight modifications, according to the technic of Papanicoloau.

The following laboratory procedure was used in this experiment:

1. Remove slide from the ether alcohol container and run it through three successive rinses in 80, 70, and 50 per cent alcohol, followed by a rinse in distilled water.

* Prepared as a requirement for post-graduate study, Periodontia Department, New York University, College of Dentistry.

† The opinions or assertions contained herein are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.



2. The slide is then stained in Harris Hematoxylin for five minutes, followed by another rinse in distilled water.

3. Dip slide in 0.5 percent hydrochloric acid eight times and quickly place in running tap water in order to remove the excess hydrochloric acid.

4. Immerse slide in distilled water for a period of eight minutes.

5. Rinse slide through three successive baths of 70, 80 and 95 per cent alcohol.

6. Stain for one minute in OG-6.

7. Run slide quickly through three successive rinses of 95 per cent alcohol.

8. Run slide through two rinses in equal parts of xylol and 95 per cent alcohol.

9. Run slide through two rinses of pure xylol.

10. Mount slide using a large size cover glass.

11. Divide slide into imaginary quadrants and place under microscope for counting and differentiation. A total of 100 cells, 25 in each quadrant, are used as an arbitrary counting standard. In the counting process, include only cells with a definite morphology and distinct staining characteristics.

FINDINGS

The cells were classified into the following three groups:

1. Basophilic staining cells with nuclei (blue).
2. Eosinophilic staining cells with nuclei (red).
3. Yellow staining cells with either small pyknotic nuclei or anuclear.

In group (1), the cells take on a light, medium or dark blue shade when exposed to the basophil stain. In smears of the parietal surface of the cheek or ventral of the tongue, the majority of the cells are big and round while others are polygonal. In this group are found many non-cornified cells with some cornified forms.

In group (2), the cells take on a light, medium or bright shade of red when exposed to the acidophil stain. They also seem to be larger in the smears of the parietal surface of the cheek and ventral of the tongue. The majority of these cells are big and well formed. Their morphology varies somewhat from round to polygonal. In this group are found many cornified cells with some pre-cornified forms.

In group (3) the yellow cells are found to be smaller and present two varieties—one with, and the other without, nuclei. Those with nuclei are commonly of a brighter color and sharper outline. The latter are irregular in shape, fragmentary and, in some cases, folded over one another. They appear to be more numerous in the smears of the dorsum of the tongue and gingiva, with lesser quantities on the parietal of the cheek and ventral of the tongue. In this group most cells are cornified.

The various stages of nuclear disintegration which include pyknosos, karyorrhexis and complete karyolysis were seen under microscopic examination.

STATISTICAL FINDINGS

	Average Number of Cells
1. *Dorsal Surface of the Tongue*	
(a) Basophilic staining cells (blue)	21
(b) Acidophilic staining cells (red)	48
(c) Yellow staining cells	31
2. *Ventral Surface of the Tongue*	
(a) Basophilic staining cells (blue)	30
(b) Acidophlic staining cells (red)	65
(c) Yellow staining cells	5
3. *Parietal Surface of the Cheek*	
(a) Basophilic staining cells (blue)	32
(b) Acidophilic staining cells (red)	61
(c) Yellow staining cells	7
4. *Gingiva*	
(a) Basophilic staining cells (blue)	26
(b) Acidophilic staining cells (red)	57
(c) Yellow staining cells	17

DISCUSSION

This method of study is based on the fact that the oral epithelia undergo a continual exfoliation. Many of the cells have a basophilic cytoplasm. Others are acidophilic and cornified.

It is logical to assume that cellular characteristics found in the aged would differ to some extent as compared to the young. For this reason, if an index or a normal base line were perfected for the aged in the study of cytologic exfoliation of the oral epithelia, it probably would differ as compared to a similar index or normal base line made for the young.

Cowdry[10] states that:

"Any discussion of the aging of individual cells must of necessity be very incomplete. It would also be lacking in orientation and perspective if they were considered simply as cells only at one period in the age of the body and not as changing members of a changing cellular community of great complexity.

The individual is profoundly influenced by the community on the cellular as well as the human level. The lives of some cells begin not later then when the body is one year old and extend until it dies. For them the changing community influence is almost coextensive with the life of the community. Others, having shorter lives, are subjected to the community during its youth, maturity or senility and even for much shorter intervals. Consequently, it is possible, even probably, that individual cells of the same sort will live somewhat different lives depending upon the period of their existence in the body."

After leaving the cell level, it is easier to visualize the gross changes that take place in the aging process of the oral mucosa and tongue. Burket[11] describes these changes in the following manner:

"The lips, the oral mucosa and the tongue in senescence present changes which are comparable with those observed in other tissues. They become atrophic: There is a loss of elasticity and a decrease in the tunica propria. The characteristic stippling of the healthy gingival and oral tissue seen in adult life is absent in the aged. The mucosa now has a satiny, waxlike or edematous appearance. The tissues frequently lack a protective layer of keratinized cells which renders them more susceptible to mechanical, chemical or bacterial irritation.

"The tongue loses its normal muscle tone and offers less resistance when palpated bidigitally. The normal papillary coating becomes decreased in amount and the dorsum of the tongue has an atrophic appearance as judged by its appearance in middle life. The decreased salivary flow often results in considerable irritation to the sides of this organ where it comes in contact with the teeth or prosthetic appliances. Glossodynia or glossopyrosis is a common complaint in the aged and many times no satisfactory explanation can be found."

While taking the smears of this aged group, it was observed that the tongue would seek a resting place in the lower gingival sulcus. It is quite possible the tongue, in this manner, could have transferred a number of cornified cells from the lower gingiva to the dorsum of the tongue since the lower central and lateral incisors were missing from the majority of this experimental group.

The aged group revealed 17 cornified cells on the average gingival count. As compared to a similar investigation conducted by Miller, Soberman and Stahl[12] of young male adults, the average gingival count was found to contain 89.4 cornified cells. Glickman and Papic,[13] in a recent investigation, also found a notable trend toward diminished gingival keratinization occuring with increased age.

It was observed clinically that, as the patients' age increased, there was a marked decrease in the elasticity of the tongue along with a dryness in the mouth. This combination made it quite difficult to obtain a good smear. Ten of the fifty patients, because of this difficulty, had to have their smears retaken at a later date.

SUMMARY AND CONCLUSIONS

1. Four sites of the oral mucosa were selected for a study of cellular cornification employing the direct smear technic of Papanicoloau.
2. Fifty aged males ranging in age from 60 to 100 years were used for this study.
3. The results indicate the degree of cornificato be highest at the dorsal surface of the tongue, followed by the gingiva, cheek and ventral of the tongue.
4. A definite decrease of gingival keratinization occurs in aged males.
5. It is possible to assume that, in the aging process, the tissue of the oral cavity lacks a protective layer of keratinized cells which renders it more susceptible to mechanical, chemical or bacterial irritation.

Parris Island, N. C.

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Grateful appreciation is expressed to Dr. Erenstoft and the Medical Board of the Brooklyn Hebrew Home and Hospital for the Aged for the courtesy shown me by providing the necessary patients and hospital facilities which enabled me to carry on this investigation.

Grateful acknowledgment is made to Doctors Samuel Charles Miller, S. Sigmund Stahl, Alexander Soberman and Rosa Iusem for their helpful guidance in the preparation of this study.

A DEVICE FOR TESTING THE SHARPNESS OF INSTRUMENTS

LOUIS R. BURMAN, PH.G., A.M., D.D.S., F.A.D.M., F.A.C.D.*
New York, N. Y.

Sharp instruments are essential to the proper completion of many dental procedures. Not alone is the work facilitated, but less pain is attached to the actual instrumentation, pressures are reduced and less chair time is needed for the operation.

A number of methods are described in various texts and articles for sharpening different types of instruments. The success of these methods depends on the skill of each operator in carrying out the technique of his choice. It is of great importance, however, for each individual to have some adequate means of testing the sharpness of the instrument on the completion of the honing process.

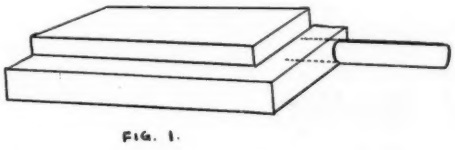

FIG. 1.

Fig. 1—Rod held in place by frictional grip.

A review of the literature on the techniques used in sharpening instruments reveals the following methods of testing sharpness:

1. The absence of reflected light from the sharp edge. This is true because a sharp edge is in effect a line formed by the meeting of two surfaces at an acute angle, and light is not reflected from a line which has no thickness. If the instrument were dull, the line would have width and therefore would reflect light. The absence of a bright line indicates that the instrument is sharp.

While this is an excellent method of testing sharpness, it may at times be unsatisfactory due to poor lighting or impaired eyesight, or to improper interpretation of reflected light, especially on curved instruments.

2. A more practical method seems to be the "fingernail test." In this method the sharp edge of the instrument is placed on the fingernail with an attempt to make a scraping. If the instrument is sharp it will take a shaving off the fingernail. It is not necessary to make a shaving. If the instrument is sharp it will "bite" into the fingernail along the entire length of the sharp edge.

This is a good method and practical, but it is not esthetic. It is frequently necessary to sharpen an instrument a number of times during a single visit. Constant fingernail testing in the presence of the patient is not esthetic, the instrument cannot be immediately and properly sterilized and the fingernail should not be required to withstand this constant abuse.

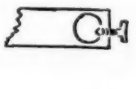

FIG. 2.

Fig. 2—Use of set screw to hold rod in place.

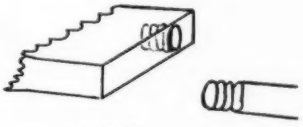

FIG. 3.

Fig. 3—Rod with thread, counter thread in case.

Because of the factors mentioned above, we have found it expedient to use a piece of medium hard flow cellulose acetate butyrate about a quarter inch in diameter for our testing. This rod may be used by itself or it may be mounted in a holder. As a matter of convenience we have mounted this rod directly onto the case of the Arkansas stone. This adds to the appearance of the instrument sharpness tester and gives it a convenience of manipulation. After sharpen-

* Assistant Professor of Periodontia, Assistant Professor of Anatomy, New York University College of Dentistry.

ing, the instrument is applied to the rod in the same manner as it would be applied to the fingernail. Sharpenss is tested by the bite of the instrument into the rod.

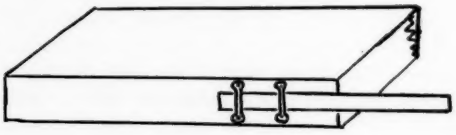

FIG. 4.

Fig. 4—Outside straps to hold rod in place.

After a number of testings, the rod becomes nicked along the line of testing. At this time the rod is given a partial turn in its socket to present a smooth surface once again. These rods can be replaced at any time.

The rod may be mounted as follows:

1. A hole is bored in the case of the Arkansas stone large enough to accept the rod (Fig. 1). If needed, a set screw will help keep the rod in place (Fig. 2).

2. The rod may be threaded with a counter thread in the case (Fig. 3).

3. The rod may be mounted with metal bands on the outside of the case (Fig. 4).

We have found this cellulose acetate butyrate rod to be an excellent aid in testing the sharpness of instruments. The method is practical, esthetic, and in our hands it works very well.

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1749 Grand Concourse

7th Annual Meeting

American Academy of Dental Medicine

FRIDAY, SATURDAY, SUNDAY, JUNE 26, 27, 28, 1953

SHOREHAM HOTEL, WASHINGTON, D.C.

(See pages 64-65)

Answers to Timely Questions

Question: A patient with diabetes mellitius shows no sign of paradontal abscess. Is this typical? What precautions should I take in treating this patient both for gingivitis and operative dentistry?

J. S. New York City

Answer.—Although periodontal abscesses are frequently associated with diabetes mellitus when it had been untreated or therapy has been inadequate, such a finding is not necessarily pathognomonic of this disease. Many other systemic diseases produce a susceptibility to periodontal abscess formation and this disturbance may also occur with local factors as the major incitant. Even though the New York Diabetes Association lists acute pericementitis, acute gingival abscess and a polypoid proliferation arising from the under surface of the free gingiva as periodontal findings that might make one suspicious of diabetes, even these findings are not decisive and should not be considered as oral symptoms of diabetes mellitus. Periodontal disease is usually caused by a combination of dysfunctional, irritational and systemic factors. Diabetes is just one of the many possible systematic factors that may enter into this complexity of causes.

In the treatment of a periodontal situation in a diabetic, it is important to work closely with the physician so that the patient is in maximum health whenever dentistry is performed. It is best not to do surgery or even to give local anesthesia, or perform any extensive or painful operative dentistry immediately after insulin is taken because the blood sugar may be quite low at that time. It is a little safer to operate when the blood sugar is a little higher and then to obtain the control of the blood sugar by the insulin after the operation so as to prevent infection or vascular complications. It should be borne in mind that the level of serum cholesterol and total blood lipids in a diabetic is at least as important as the sugar level, since it is in this medium that vascular complications and the greater susceptibility to infection may arise.

In other respects the periodontal disease of diabetics should be handled the same as in non-diabetics.

Samuel Charles Miller

Question: Does chlorophyll have benefit in the treatment of periodontitis?

G. A., Baltimore, Md.

Answer.—This question is interesting because it demonstrates the inverse development of interest in therapeutic techniques, namely, from commercial sources to professional interest. We received a request for an appraisal of a then current magazine article[1] on a chlorophyll toothpaste. This article oversimplified both the causes and treatment of periodontal disease to create the impression for its lay readers that "gum treatments can now be handled largely in the home by the person himself." In the presence of undiagnosed periodontal pathosis the creation of such false sense of security is harmful. The Council on Dental Therapeutics of the American Dental Association issued a preliminary report[2] on Chloresium Toothpaste which was submitted to the Council for evaluation. This report, with which we fully agree for purposes of the answer to the above question, states:

Chloresium Toothpaste has been submitted to the Council on Dental Therapeutics for re-evaluation. In support of the claims for the product, the firm has furnished several unpublished reports of clinical studies and some colored slides depicting the appearance of gingival tissues before and after the use of the dentifrice.

A Council referee reports as follows:

"These case reports are unimpressive as evidence in support of periodontal therapeutic claims made by the firm. The photographic evidence reveals nothing that is not routinely accomplished by basic measures without the use of Chloresium products. In a number of these cases several therapeutic measures were employed; yet the results were attributed to the use of Chloresium products, without the benefit of controls. As judged by the photographic evidence in several of these case reports, doubt may be expressed with reference to the diagnosis and statements concerning etiology."

Since the Council's preliminary consideration of the available evidence gives rise to grave doubts about the remarkable statements[1] concerning this dentifrice, the profession may be well advised to adopt a conservative attitude toward this subject until a more comprehensive examination can be completed.

More recently, a report[3] giving the results of a study at Boys Town of the gingival effects of a dentifrice which included a derivative of chlorophyll was published. This information was also presented to the public prematurely. The folowing statement, issued jointly by Dr. Thomas J. Hill, chairman of the Council on Dental Therapeutics of the American Dental Association and Dr. Maynard K. Hine, Editor

of the Journal of Periodontology[4] emphasized the fact that "overly optimistic claims in the advertisement for the usefulness of Chlorodent were not in conformity with the careful and moderate statements in the manuscript." The following are the concluding remarks of their statement, and we are fully convinced that chlorophyll has no benefit in the treatment of periodontititis.

"Several important differences are presented here in brief so that the profession may be prepared, in some measure, to provide explanatory information to patients.

"After only two months the percentage of improved cases was significantly higher in the group using the 'chlorophyllin' pastes than in the control group. At the end of nine months, however, the boys in the experimental group and those in the control group had benefited to about the same degree.

"The study was carried out under supervision that included toothbrushing instruction and checks of regularity of brushing, which is in keeping with good control in scientific investigations. Whether similar results may be obtained under ordinary conditions of use in the home has yet to be proved.

"An increase in the severity of gingivitis was also noted in some cases, presumably as a result of the irritant effect of calculus.

"Several important facts which the general reader will not discern from the advertisement are emphasized in the following quotation from the manuscript:

The dramatic improvement in gingivitis observed in this study is undoubtedly related to the initially high incidence of gingivitis in these children. It would be important also to determine the effects of toothbrushing with a dentifrice containing chlorophyllin in a low gingivitis group. Similarly, it will be important to determine the effects of toothbrushing and the effects of chlorophyllins in adults since the character of the gingivitis tends to change with age.

"The advertising program may mislead the consumer into the belief that by the use of Chlorodent toothpaste, professional attention to gingival disorders may be postponed or obviated. It would seem important, therefore, for dentists to inform their patients that while proper toothbrushing is important in the maintenance of oral hygiene, it is not a substitute for professional treatment."

J. LEWIS BLASS

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Question: What are the indications and contraindications for periodontal surgery?

B. K., Cleveland, Ohio.

ANSWER.—Of the various surgical techniques, the gingivectomy is in most common usage. Indications for employing the gingivectomy include periodontal pockets, bifurcation and trifurcation involvement, periodontal abscesses, periodontal flaps, and gingival enlargement. The periodontal pocket constitutes the most common condition for which the gingivectomy is employed.

A question frequently asked is "how deep should a pocket be to warrant treatment by gingivectomy?" It is not possible to answer this question dogmatically in terms of millimeters. Gingivectomy should be employed whenever there is some doubt in the mind of the operator as to whether he can eradicate a periodontal pocket by scaling and curettage alone. The existence of such doubt is the indication for the use of gingivectomy.

It is sometimes suggested that the gingivectomy should be "resorted to" for the eradication of a pocket after scaling and curettage has failed. Such a viewpoint, in addition to being erroneous, is poor periodontal practice. If the operator has sufficient confidence in the gingivectomy to utilize it after other methods have failed, he should use the gingivectomy at the outset; particularly in cases in which there is initial doubt in his mind regarding the likely effectiveness of the other methods. The patient should receive the benefit of the doubt and be spared the inconvenience of being subjected to heroic attempts with techniques that offer only a possibility of success.

Experimentation with scaling and curettage in those cases where gingivectomy is actually required is contraindicated for the following reasons: (a) It leads to unnecessary injury to the tooth surface as the result of repeated unsuccessful scaling and curettage. (b) The failure of scaling and curettage in cases where it ought not have been tried discourages the operator and may lead to the extraction of teeth which could be retained if the gingivectomy had been used initially. (c) It discourages the patient and undermines his confidence in periodontal therapy. It is sometimes difficult for a patient to understand why the operator chooses to experiment with a technique which, in his case, at least, is of questionable effectiveness; while he withholds a technique which he actually feels could obtain the desired result.

The therapeutic principles underlying the scaling and curettage technique and gingivectomy are basically the same. The difference is one of degree and not of kind. Each technique has its proper place. Limitation of practice to "scaling and curettage alone," or adherence to a "scaling and curettage first" clinical philosophy, are as ill advised as the

use of the gingivectomy technique for all periodontal disturbances.

There are two basic contraindications for periodontal surgery. First, it is not to be looked upon as a technique to be employed in patients with a hopeless prognosis. There is no more justification for use of periodontal surgery than other treatment techniques in such patients. Second, in common with all forms of surgery, periodontal surgery should not be instituted until systemic debility or qualifying systemic diseases have been corrected, or until precautionary measures have been instituted to minimize the likelihood of undesirable post-operative sequelae.

IRVING GLICKMAN

Question: What are the principles involved in the reattachment of periodontal tissues?

J. B., Philadelphia, Pa.

ANSWER.—The principles involved in reattachment of the periodontal tissues are:

1. Complete removal of the epithelial lining of the pocket.
2. Complete removal of the epithelial attachment.
3. Complete removal of calcareous deposits from the root surface.
4. Removal of the necrotic and infected root surface (cementum).
5. Formation of a blood clot.
6. Ability of the connected tissue to organize the blood clot and attach itself on the surface of the hard tissue by laying down cementum.
7. Immobilization of tooth or teeth involved.
8. Prevention of disturbance (mechanical or bacterial) of the blood clot, by close adaptation of tissues to the teeth.

From these principles, it becomes evident that "reattachment" is biologically possible, but practically difficult to achieve. An intrabony pocket gives the best chance for success. A reattachment should be attempted in selected cases where there is hope of success. It has been claimed lately* that removal of the epithelium may be done more easily by the use of "antiformin"—a hypochloride preparation first used in 1920 by Gottlieb in endodontic treatment to clean necrotic pulps by liquefaction. It is surely worth trying. However, no one should expect this to be a miracle drug. The principles still have to be fulfilled!

B. ORBAN

* Box, H. K., Journal of the Canadian Dental Association, June, 1950.

AMERICAN ACADEMY OF PERIODONTOLOGY

The annual spring seminar of the American Academy of Periodontology will be held in Ann Arbor, Michigan, on April 27, 28, and 29, 1953. All members of the Academy are eligible to attend, and the arrangement committee feels that the program should justify a good attendance. The fee for the course is $25.00 and payable on application, or at the time of registration. Those planning to attend this meeting should write to Dr. William R. Mann, W. K. Kellogg Foundation Institute, Graduate and Postgraduate Dentistry, Ann Arbor, Michigan. The applicant must write to the Michigan Union, Ann Arbor, Michigan, and make a room reservation, giving the time of arrival and departure. Make mention of the fact that you are planning to attend the seminar of the American Academy of Periodontology. We are not permitted to make reservations for you. Guests may attend the meeting if sponsored by a member of the Academy. Each member is entitled to one guest. Attendance limited to 50.

Medical Views on Oral Problems

PENICILLIN ANAPHYLAXSIS*

COMMENT

There are surprisingly few reports in the literature of severe, immediate, anaphylactic-like shock due to penicillin, such as those recorded here. This is puzzling in view of the ease with which this series was collected in a short period, and the widespread and perhaps indiscriminate use of this antibiotic.

Analysis of these cases makes certain facts evident. All six patients had received previous penicillin therapy. Four of the six had histories of prior penicillin hypersensitivity reactions. Intradermal direct skin testing with penicillin gave an immediate wheal type of reaction in two of the three cases in which it was done. In the third patient an almost fatal constitutional reaction developed from the skin test. Passive transfer demonstration of circulating reagins for penicillin was successful in four of the five cases studied. The precipitin reaction was uniformly negative.

In all cases of acute anaphylactic-like shock due to penicillin hypersensitivity reviewed in the literature, the immediate wheal type of skin reaction to penicillin was postitive when the test was performed. The value of immediate direct skin testing in discovering those patients susceptible to anaphylactic-like shock reaction from the administration of penicillin is indicated by the literature and our own experience.

It seems reasonable to infer that the described shock reactions are commoner than is generally appreciated. Certainly as more time passes and if the drug is used as widely as it is now, more and more persons will become sensitized. Such a state of affairs occurred in the past with the use of horse serum in antiserums. More critical criteria for the use of penicillin would seem desirable. The incorporation of penicillin in gums, gargles, and mouth and throat lozenges, its administration for mild illnesses such as the common cold, and the treatment of disease caused by organisms not susceptible to its action, should be condemned.

All patients about to receive penicillin therapy should be interrogated about their past experiences after receiving this drug, and especially as to the possibility of any untoward reactions following its administration. In the event of a positive or questionable history of penicillin hypersensitivity, skin testing with a high dilution of penicillin is indicated. Scratch testing with the material to be administered may be substituted. In the event of a positive immediate skin test penicillin is either contraindicated or is given as a calculated risk warranted by the seriousness of the presenting condition. If the incidence of shock reactions appears greater after future reports, it may be advisable to skin test all patients who have previously received penicillin before readministering the drug. It is improbable that successful rapid desensitization for inducing an antianaphylactic state is feasible or possible.

SUMMARY

Six cases of acute anaphylactic-like shock due to penicillin hypersensitivity are reported. The value of immediate skin reactions in indicating susceptible cases is described. Methods of avoiding these acute reactions are discussed.

* Comment and summary of an article published in J.A.M.A., Jan. 31, 1953, p. 301.

CLEFT PALATE*

Studies on mice by a team of Canadian investigators suggest that cleft palate can be caused by administration of cortisone to the pregnant female.

By giving cortisone to pregnant mice early in gestation, F. Clarke Fraser and associates at the McGill University Department of Genetics were able to produce a high incidence of cleft palate in the offspring—up to 100 per cent in a susceptible strain, 18 per cent in a similarly treated resistant strain. T. D. Fainstat, one of the team who reported on the work, said that in a few cases cleft palate was even produced with cortisone given at a stage of gestation when embryologically the palate is normally closed. The dosage used is tremendous in human terms. Comparable doses would never be used in patients. The author cautions that comparisons often among various species can be misleading.

He also reported that concurrent statistical studies confirm the findings of a Swedish worker (Fogh-Anderson) that if the family history has been positive for cleft palate, the incidence is 12 per cent, while with a negative family history the incidence is 1.8 per cent. The chances for cleft palate in siblings of patients with this defect are 44 times greater.

* Reported by American College of Surgeons, reprinted in Pfizer advertisement, J.A.M.A., Jan. 31, 1953, p. 27.

BLOOD DIASTASE*

The normal range of blood diastase in man is 80 to 150 Somogyi units. . . . In the presence of acute pancreatitis the blood diastase content usually rises about 1,000 units. . . . The highest value for blood diastase is almost invariably revealed by the earliest specimen obtained, even though this is less than an hour after the onset of symptoms. . . . Consecutive specimens show a fairly progressive decline, so that the normal level is frequently reestablished within twenty-four to forty-eight hours. The height of the diastase level and the duration of its elevation do not parallel the clinical severity of the attack. Furthermore, there are no characteristic differences in the behavior of diastase in acute transient pancreatitis and acute pancreatic necrosis.

An elevated blood diastase level may also accompany other abnormal states. The most common of these is retention of normally excreted blood constituents due to renal disease. Renal retention may give rise to blood diastase levels as high as 1,200 units. The other abnormalities with which an elevated diastase content may be associated—obstructive and inflammatory diseases of the salivary glands, carcinoma of the pancreas and perforated duodenal ulcer (usually, but not always, posterior)—seldom give rise to levels over 1,000 units. . . . Among other conditions in which a blood diastase level of less than 1,000 units is present, is subsiding pancreatitis. Blood diastase levels of 1,500 units or more may be considered pathognomonic of acute pancreatitis. For an elevated diastase level of less than 1,500 units to be accepted as diagnostic of acute pancreatitis the other causes of diastase elevation must be eliminated. —J. G. Probstein, M.D., Pancreatitis: Current Concepts, *Journal of the International College of Surgeons,* October, 1952.

* J.A.M.A., Jan. 31, 1953, p. 371.

GREEN TEETH*

When a Rh-negative woman marries an Rh-positive man, she may conceive an Rh-positive fetus. The fetus may stimulate her to produce anti-Rh antibodies, which pass across the placenta and attack the fetal erythrocytes. Large numbers of red cells are destroyed and the hemoglobin released is broken down into pigments, which give the baby severe jaundice. Some of those who have had severe jaundice may, if they survive, show a curious vestige of the symptom when their first teeth appear; they have green teeth. This is due to the altered blood pigment being deposited in the tooth buds. It varies from green to brown and is most frequently seen in the central incisors, about 5% of such infants are affected in this way, but the second dentition is normal.

* Abstract, J.A.M.A., Dec. 13, 1952.

CHRONIC GLOSSITIS WITHOUT ANEMIA*

Bastrup-Madsen reports on five patients in whom glossitis was regarded as a manifestation of latent pernicious anemia although megalocytic anemia was absent. The lingual symptoms had lasted from 6 months to 15 years before the start of specific antipernicious anemia treatment. In three cases there were mild and in one case marked symptoms of combined sclerosis. In all cases there was histamine-fast achylia, with slight increase in the color index, hemoglobin values from 80 to 92%, and normal leukocyte counts. The bone marrow showed maturation disturbances in the myeloid series of the type seen in pernicious anemia. In all cases improvement in the lingual symptoms occurred from 5 to 10 days after specific treatment was begun, with complete disappearance of the symptoms in one of the three cases in which liver treatment was given and in the two cases in which vitamin B_{12} was given. The color index approached 1. In the four cases in which the bone marrow was examined after specific treatment for two weeks the bone marrow picture had returned to normal. As in every other form of pernicious anemia, specific treatment once started must be continued. Interruption of the treatment may lead to the development of irreparable tongue and nerve lesions. The author concludes that as iron deficiency may cause mucosal changes without giving rise to anemia, absence of the antipernicious anemia principle may cause glossitis without accompanying anemia. Examination of the bone marrow may be a valuable diagnostic aid.

* Abstract, J.A.M.A., Feb. 7, 1953.

GONGYLONEMA INFECTION IN SOUTH CAROLINA

REPORT OF A CASE

Martin D. Young, Sc.D., Columbia, S. C.
and
Isaac Hayne, M.D., Congaree-Eastover, S. C.

The parasitism of man by the nematode Gongylonema is rarely reported. In 1951, Craig and Faust listed 14 cases. Since then, the 15th case has been reported. Seven of these originated in this country, one each from Florida, Georgia, Alabama, Louisiana, and Arkansas, and two from Virginia. Following is the report of a case in which, in 1945, an immature female Gongylonema was removed from the mouth of a Negro woman living in Congaree, S. C.

REPORT OF A CASE

The host was a Negro woman, 26 years of age, in good physical condition, who was employed in a laundry. About 9 o'clock one night the patient felt with her tongue a foreign body under the mucosa of

her upper lip near the junction with the upper gum. By the following morning the object had moved to the middle of the cheek about half the distance from the mouth to the posterior part of the jaw. She examined this area with a mirror and saw a white coiled worm just under the surface of the mucosa. She went to a physician, but he could find no trace of the worm. Later that afternoon she again felt the worm, this time at the top of the lower lip. It felt to her as if the worm were emerging. At about 5 p.m. she came to one of us (I. H.). The worm was easily seen and apparently was in the process of emerging from the mucosa. It was extracted by grasping the free end with splinter forceps and exerting gentle traction. The worm was removed easily without pain or discomfort. After extraction the worm was exceedingly active, exhibiting a writhing motion and flexing upon itself. This activity continued until the worm was immersed in rubbing alcohol. The subsequent history of the patient was uneventful.

The active migration of the worm is of interest. From the center of the upper lip it migrated half the length of the right cheek and then back again to the center of the lower lip in a period of 20 hours. The worm was thread-like and white in appearance. Its greatest width was 0.18 mm. In handling, the worm was broken into several pieces. An approximation of the length was 17 mm.

The normal definitive hosts of Gongylonema are ruminants, monkeys, swine, and other animals. The eggs of the parasite are invested by dung beetles and cockroaches, in which some development occurs. The definitive host acquires the infection by eating the parasitized intermediate host. Man is an accidental host, obtaining the infection by food or drink into which the intermediate host has fallen.

The route by which the worm infected this patient is unknown. She lived on a farm and obtained drinking water from a dug well, about 20 feet deep, by the use of wooden buckets and a rope. The well housing was not tightly constructed, so that it would be easy for insects to fall into the water. The barnyard was about 1000 feet from the house, and the well was situated about half-way between. Cockroaches were fairly common around the house. While it is possible that she could have obtained the infection by other means, the most obvious source appears to be contaminated well water.

Dr. W. W. Cort, Johns Hopkins University, and Mr. John T. Lucker, Bureau of Animal Industry, U. S. Department of Agriculture, examined the specimen, and both identified the worm as Gongylonema. Mr. Lucker believes that the present specimen is Gonglyonema pulchrum.

SUMMARY

An immature specimen of the nematode Gongylonema (probably Gongylonema pulchrum) was found in the lip mucosa of a Negro woman in South Carolina. It appears that the most likely source of infection was well water contaminated by an intermediate vector. This apparently is the first reported case of human infection by this parasite from South Carolina and the eighth from the United States.

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* Case report, J...M.A., Jan. 3, 1953.

TUMORS OF THE PAROTID GLAND*

Ever since Virchow wrote "Mixed Tumors of the Parotid" in 1863, tumors of the parotid gland, while rare, have provided a seemingly inexhaustible topic of conversation for pathologists and surgeons. Ordinarily, most patients will disregard the presence of a tumor of the parotid gland in its early stages because it is painless and slow-growing. In fact, physicians may have doubts at times concerning this type of lesion, as the enlargement appears innocuous; there is the possibility of injuring the facial nerve during surgical intervention; and some have believed that parotid tumors inevitably recur. James and Saleeby assert that it is not at all uncommon to encounter parotid gland tumors that have either existed for several years or been inadequately treated by previous surgical intervention.

Diagnosis of this entity is usually based on the clinical history and physical findings, although both have limitations. Sialography, which permits roentgen visualization of the parotid gland after the injection of a radio-opaque substance into the parotid duct, is frequently helpful in differentiating neoplastic lesions from inflammatory involvements originating in the parotid gland. Moreover, the procedure assists in determining whether a mass lies superficially or deeply in relation to the facial nerve and the parotid gland. Sialography is a comparatively simple procedure, which requires little time or effort and furnishes valuable information in planning the surgical approach to the removal of a parotid gland tumor. In addition to the sialographic studies, biopsy of the parotid mass should be undertaken.

According to Buxton and his associates, the presence of a new growth in the parotid gland is an indication for its removal. All parotid tumors, whether benign or malignant, should be treated by means of total parotidectomy. James and Saleeby maintain that regardless of how benign, how encapsulated, or how superficially located the new growth may appear, the lesion is potentially dangerous. Many malignant tumors are well encapsulated and show no evidence of local infiltration of benign or malignant histopathological changes in parotid gland tumors is difficult and oftentimes impossible, the pathological diagnosis should cause minimal concern if the parotid gland tumor is treated by total removal. In many cases of parotid gland cancer, total

parotidectomy, despite loss of facial nerve function, has proved curative.

In general, if it is not feasible to completely eradicate tumor tissue by surgical means, radiation in the form of x-ray, radium, or cobalt may be utilized; however, radiation therapy should play but a small role in the treatment of parotid gland tumors. Benign tumors are radioresistant and should therefore be treated by surgical excision; malignant tumors are more responsive to roentgen-ray therapy, which is occasionally helpful. Roentgen therapy alone in the primary treatment of malignant tumors of the parotid gland rarely cures; it is an acceptable procedure when surgical intervention is contraindicated.

The prognosis for survival of patients with tumors of the parotid gland depends on the presence and degree of malignancy and on the completeness with which resection of the tumor can be accomplished. Since it is not always possible to differentiate benign from malignant lesions unless facial paralysis is present or unless distant metastases have occurred, early complete removal of the tumor is imperative.

* Editorial, J.A.M.A., Jan. 31, 1953, p. 388.

OCULAR MUCOUS MEMBRANE SYNDROME*

TO THE EDITOR:—*I would like information on conjunctivitis associated with erythema multiforme, which, I believe, is known as the Stevens-Johnson syndrome. I have a patient who had a severe attack of membranous conjunctivitis, pharyngitis, and erythema multiforme.*

M.D., Washington.

This inquiry was referred to two consultants, whose respective replies follow.—ED.

ANSWER.—The consensus is that the Stevens-Johnson syndrome is a variant of erythema multiforme. The clinical features include acute onset of fever, vesicular eruption of the mouth, conjunctivas, genitals, and anus, and multiforme eruption of the skin. Partial or total blindness may result if ocular involvement is severe. The cause is unknown, but a virus has been implicated in certain cases. Treatment includes general supportive measures, antibiotics to combat secondary infections, and perhaps adrenocorticotropic hormones. Pertinent references are included in an article by Huff and Addenbrooke on eponymic syndromes of the skin, eyes, ears, nose, and throat (*Eye, Ear, Nose & Throat Month.* 31:303 [June] 1952).

ANSWER.—Several excellent reviews of the ocular-mucous membrane syndrome have been made in recent years. Robinson and McCrumb (Comparative Analysis of Mucocutaneous-Ocular Syndromes: Report of 11 Cases and Review of Literature, *Arch. Dermat. & Syph.* 61:539 [April] 1950) conclude that the condition is a variant of erythema multiforme exudativum (Hebra's disease). It has been described by a variety of terms, depending on the mucous surface involved, the age of the patient, and the field of interest of the investigator reporting; these are Stevens-Johnson syndrome, Reiter's disease, pemphigus of conjunctiva, essential conjunctival shrinkage, ectodermosis erosiva pluriorificialis, and Behcet's syndrome. It has been suggested that Behcet's syndrome is a distinct entity (France, R.; Buchanall, R. N.; Wilson, M. W., and Sheldon, M. B., Jr.: Relapsing Iritis with Recurrent Ulcers of Mouth and Genitalia, [Behcet's Syndrome], *Medicine* 30:335 [Dec.] 1951).

At onset of the disease there may or may not be a fever, and there may be headache and prostration of varying severity. Simultaneously, or within 72 hours, there is a cutaneous eruption characteristic of erythema multiforme symmetrically involving the face, arms, and legs. The onset may be marked by the appearance of oral lesions with bullae or erosions of the lips and buccal membranes and complete absence of skin manifestations. Eye manifestations, such as conjunctivitis, iritis, or keratitis, may occur at the onset or be delayed several weeks. Involvement of other mucous surfaces may cause balanitis, urethritis, arthritis, vaginal erosions, pharyngitis, rectal strictures, otitis media, and pulmonary complications.

The ocular symptoms vary in severity and may disappear without residue or may persist for years. The commonest type of ocular involvement is a catarrhal conjunctivitis which clears rapidly and may not be noted. The most serious involvement is a pseudomembranous conjunctivitis with necrosis, followed by cicatrization and symblepharon formation. The cornea may be involved, with marked scarring and diminution of vision; the iritis of Behcet's syndrome is especially likely to cause visual loss.

The cause of the disease is not known. Robinson (Ocular-Mucous Membrane Syndrome, *M. Clin North America* 35:315 [March] 1951) believes it is probably caused by a virus and that a "trigger mechanism," such as the administration of barbiturates, coal tar derivatives, and penicillin may set in motion the forces that produce this condition. Hensen (Mucocutaneous Eruptions, Including Conjunctiva, Due to Drug Sensitivity: Etiological Similarity to Pemphigus, *Tr. Am. Ophth. Soc.* 48:395, 1950) suggested the condition may be due to drug sensitivity, with the sulfonamides being especially common offenders. The question is difficult to settle, however, since the presenting symptoms often are such as to lead to treatment with the sulfonamides; then the ocular symptoms, occurring some weeks later, may be attributed to the drug rather than be recognized as a sequela of a syndrome that had its onset prior to the sulfonamide therapy.

* J.A.M.A., Feb. 7, 1953.

Academy Proceedings

PRESENTATION OF CHARTER TO PHILADELPHIA SECTION

L. to R. (front row): Drs. Jacoby Rothner, Alvin Berman (National President elect), Leon J. Pinsker, Harold Gelhaar (National President), Joseph Macri, Bernard Saturen (Chapter President) receiving the Charter, Samuel Rossman, George Stewart, Alex Weinberger, Sarah Kaplan.

L. to R. (back row): Drs. Joseph Bernstein, Walter Cohen, C. Sauser, Winston Cruzan, Paul W. Montgomery, Samuel Seltzer, Herbert Jenoff, S. Leonard Rosenthal.

THE ACADEMY LOSES A FRIEND

It is with deep regret that the Academy of Dental Medicine announces the passing of Jerome Kalin of Milburn, N. J., on December 23, 1952 after a short illness.

Jerome Kalin was born in Newark, N. J. 39 years ago and moved to Milburn just a few months ago. A graduate of New York University College of Dentistry, he was a member of the Academy, the Newark Dental Club, the Essex County Dental Society and Alpha Omega Fraternity Alumni Club.

He leaves his wife, Mrs. Thelma Kalin, a son, Joel, and a daughter, Joyce. He is also survived by his father, Jacob Kalin, and a sister, Mrs. Herbert Kreps, both of Newark, N. J.

The Academy membership joins with the New Jersey Section in extending our sincerest condolences to his family.

See you in Washington — June 26, 27, 28

(See pages 64-65)

Announcements

POSTGRADUATE TRAINING IN PERIODONTIA AND ORAL MEDICINE NEW YORK UNIVERSITY COLLEGE OF DENTISTRY

The Periodontia Department of New York University College of Dentistry which has been giving postgraduate courses in this subject since 1926, announces its full time course in Periodontia and Oral Medicine for one academic year, September 21st 1953 to May 21st 1954, leading to a certificate. Half-time two year courses are also given. Three weeks refresher courses, as well as ten session, (one evening weekly), introductory courses are given beginning June 1, 1953 and Oct. 8, 1953. All courses are under the direct supervision of Dr. Samuel Charles Miller.

For information concerning the above or courses in other phases of dentistry write to Secretary, Postgraduate Division, New York University College of Dentistry, 209 East 23rd Street, New York 10, N. Y.

POSTGRADUATE TRAINING IN DENTURE PROSTHESIS NEW YORK UNIVERSITY COLLEGE OF DENTISTRY

The Department of Denture Prosthesis of New York University College of Dentistry will offer courses in complete and partial dentures from June 1, 1953 through June 12, 1953.

The course in complete dentures will consist of 60 hours of lectures, demonstrations and clinical practice. The first part of each session will include a lecture and patient demonstration, and a maxillo-mandibular restoration will be completed during these demonstrations. The second part of each session will be spent in the clinic where each registrant will make a complete denture restoration for an edentulous patient. The course is under the direct supervision of Professor George Buckley and staff.

A 60 hour course in partial denture design and construction will include lectures, demonstrations, and clinical treatment of patients. The lectures include: basic concepts of partial denture design; circumferential clasps; bar (Roach) clasps; rest design; palatal and lingual bar construction; surveying; impression making; analysis of cast and wrought wire clasps; analysis of gold and chrome alloys; diagnosis and treatment planning. Demonstrations will illustrate the construction of one piece cast partial denture. The clinical practice consists of impression making using the hydrocolloids and alginates in conjunction with modeling compound; pouring of casts; surveying; designing; prescription writing to laboratories; fitting the completed framework; record taking; setting of teeth; insertion of finished denture; and correction of occlusion. Time will also be devoted to the designing of difficult and unusual cases. All lecture and clinical work is done under the supervision of Assistant Professor Louis Blatterfein and staff.

OHIO STATE OFFERS POSTGRADUATE COURSES

The College of Dentistry, The Ohio State University, will present the following postgraduate courses in dentistry during the spring of 1953:

March 30-April 3.....CROWN AND BRIDGE—Dr. Frank C. Starr
April 6-10.....GENERAL ANESTHESIA—Dr. Morgan L. Allison
April 13-17.....ORAL PATHOLOGY AND DIAGNOSIS—Dr. H. B. G. Robinson
April 27-May 1.....AIRBRASIVE TECHNIC—Dr. John N. Bowers and Dr. Robert T. Trippy
May 4- 8.....ORAL SURGERY—Dr. D. P. Snyder
May 11-15.....PERIODONTICS—Dr. John R. Wilson
May 11-15.....PARTIAL DENTURE PROSTHESIS—Dr. Victor L. Steffel
May 18-22.....FULL DENTURE PROSTHESIS—Dr. Carl O. Boucher
May 18-22.....ENDODONTICS—Dr. J. Henry Kaiser
June 15-19.....ANATOMY OF THE HEAD AND NECK—Dr. Linden F. Edwards

Each course is given for five consecutives days—Monday through Friday—and the enrollment is limited to approximately ten per class. The fee is $50 per course with the exception of Oral Surgery and Airbrasive Technic for which a fee of $100 is charged.

Further information and application may be secured from the Postgraduate Division, College of Dentistry, Ohio State University, Columbus 10, Ohio.

POSTGRADUATE COURSE IN ORAL PEDIATRICS AT TUFTS

Five Consecutive Days 9 A.M.-5 P.M. June 15 to 19, 1953
Tuition $125.00 Class limited to 12
Dr. Kenneth A. Easlick

This course will be conducted by Dr. Kenneth A. Easlick, Professor of Dentistry, University of Michigan. It will consist of lectures, didactic instruction, and clinical work by the participants under the supervision of Dr. Easlick assisted by the Staff of the Department of Oral Pediatrics of Tufts Dental School.

Tufts College Dental School announces its full-time graduate program for the academic year of 1953-54. Courses are offered at a graduate level which lead either to a Certificate of Accomplishment or to the degree of Master of Science or Master of Dental Science. Courses leading to a Certificate give special emphasis to clinical training. Such courses require a minimum of one year of study but may be continued over a greater period of time in order to meet the requirements of specialty boards. Courses leading to the Master's degree stress background material at the basic science level, and in addition provide clinical experience. A minimum of 18 months in residence is required for the Master's degree.

Applications for the academic year which begins Oct. 1, 1953 are now being considered. For further information and application please contact the Director of Graduate and Postgraduate Studies, Tufts College Dental School, 136 Harrison Ave., Boston, Mass.

ACADEMY FOR ORAL REHABILITATION OF HANDICAPPED PERSONS ORGANIZES

Announcement is made of the formation of the Academy For Oral Rehabilitation of Handicapped Persons.

The purposes of the Academy are to promote and maintain high standards of dental care and treatment of the physically and mentally handicapped persons; to encourage and qualify themselves to treat physically and mentally handicapped persons; and to promote research in all branches of dental care and treatment of the physically and mentally handicapped persons and to publish the results thereof.

The first meeting of the Academy For Oral Rehabilitation of Handicapped Persons will be held in conjunction with the annual meeting of the American Dental Association in Cleveland during the fall of 1953.

Information as to details concerning the Academy may be obtained by writing to: Dr. Manuel M. Album, 1930 Chestnut Street, Philadelphia 3. Pa.

ARMED FORCES MEDICAL DEPARTMENTS SYMPOSIUM TO BE HELD AT GREAT LAKES

Several internationally known speakers will appear at a joint armed forces medical departments symposium to be held May 6-8 at the U. S. Naval Hospital, Great Lakes, Ill.

Among the subjects slated for discussion are atomic energy, disaster control in the event of an atomic war, and reserve matters.

The symposium will be open to all officers of the medical, dental, nurse, medical service and hospital corps of the armed forces. It is sponsored by the Commandant, Ninth Naval District, Commanding General Fifth Army and the Commanding General, Tenth Air Force.

Retirement and promotion points will be given all reserve officers of the various medical departments not on the inactive status list who attend this meeting.

Further information may be obtained from the District Dental Office, Ninth Naval District, Great Lakes, Ill.

INTERNATIONAL ACADEMY OF ANESTHESIOLOGY

The next meeting of the International Academy of Anesthesiology will take place on Wednesday, May 13th, 1953 at the George Washington University Hospital, Twenty-Third Street at Washington Circle, Washington, D. C.

A one day seminar in General Anesthesia will be presented by Dr. Charles S. Coakley, Director of Anesthesiology.

Interesting phases of anesthesia procedures relating to oral operations will be demonstrated.

Members and guests are invited to participate in the discussion that will follow.

Information concerning membership in the International Academy of Anesthesiology can be obtained from Dr. Irwin G. Tomack, Executive Secretary, 355 East 149th Street, New York 55, New York.

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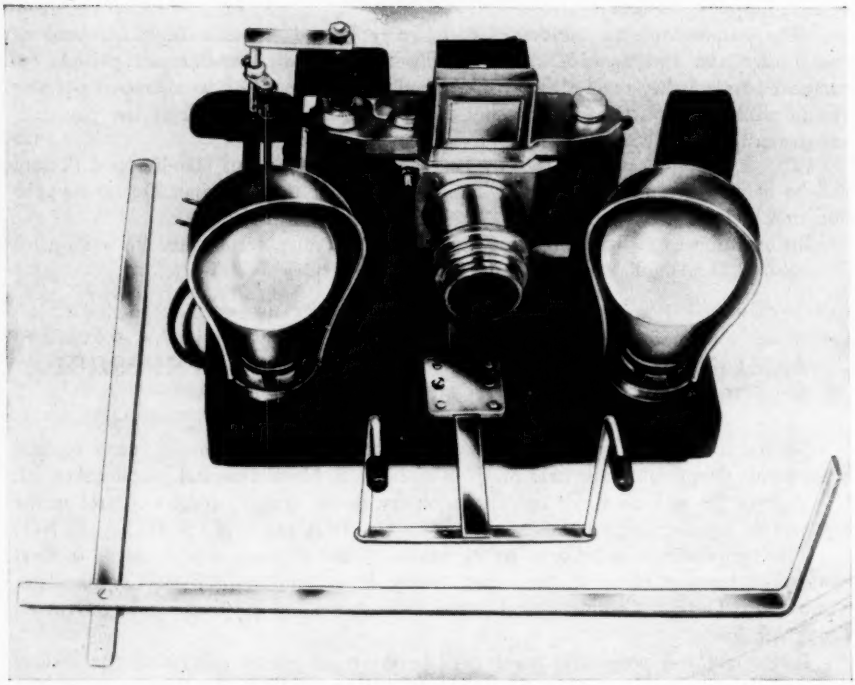

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